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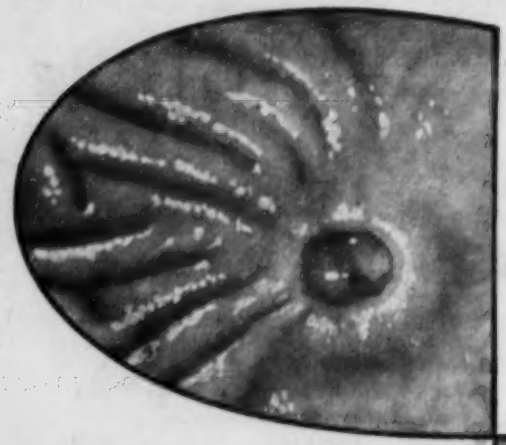

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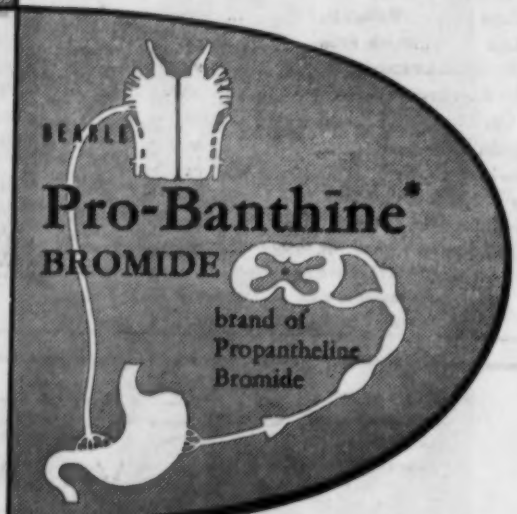

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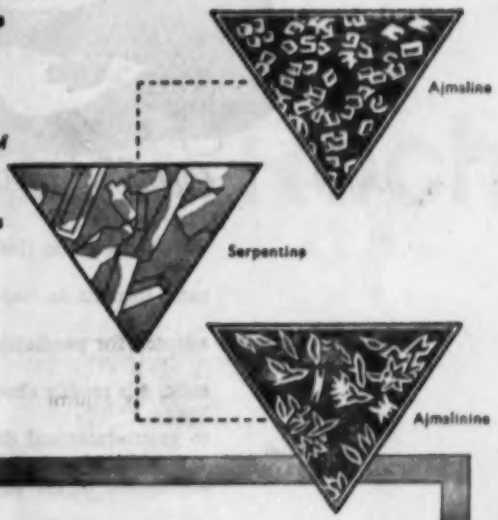

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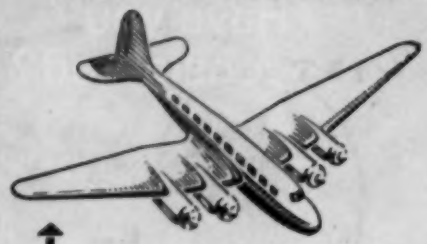

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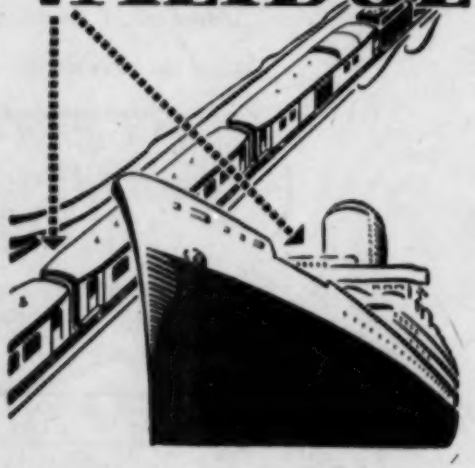

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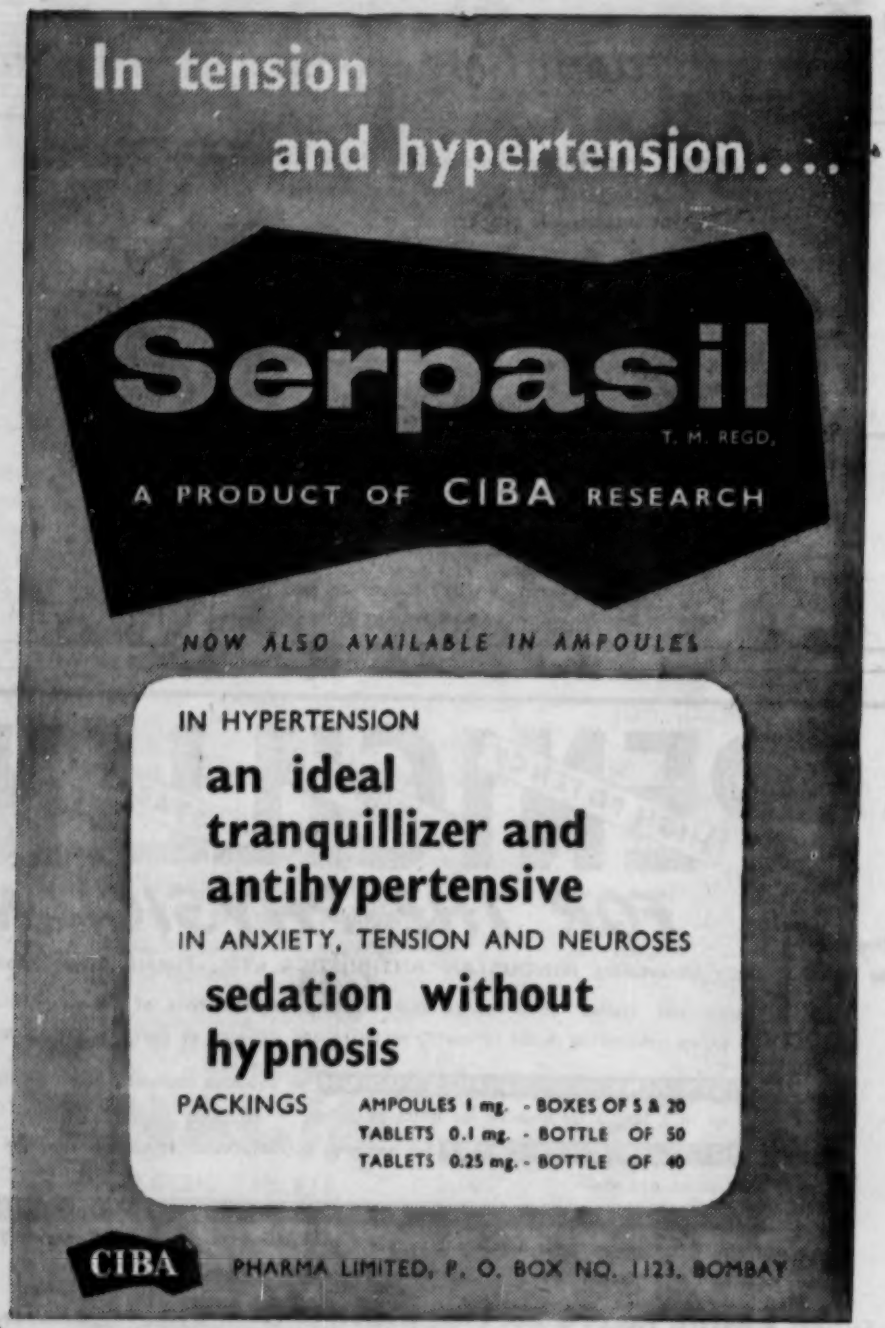
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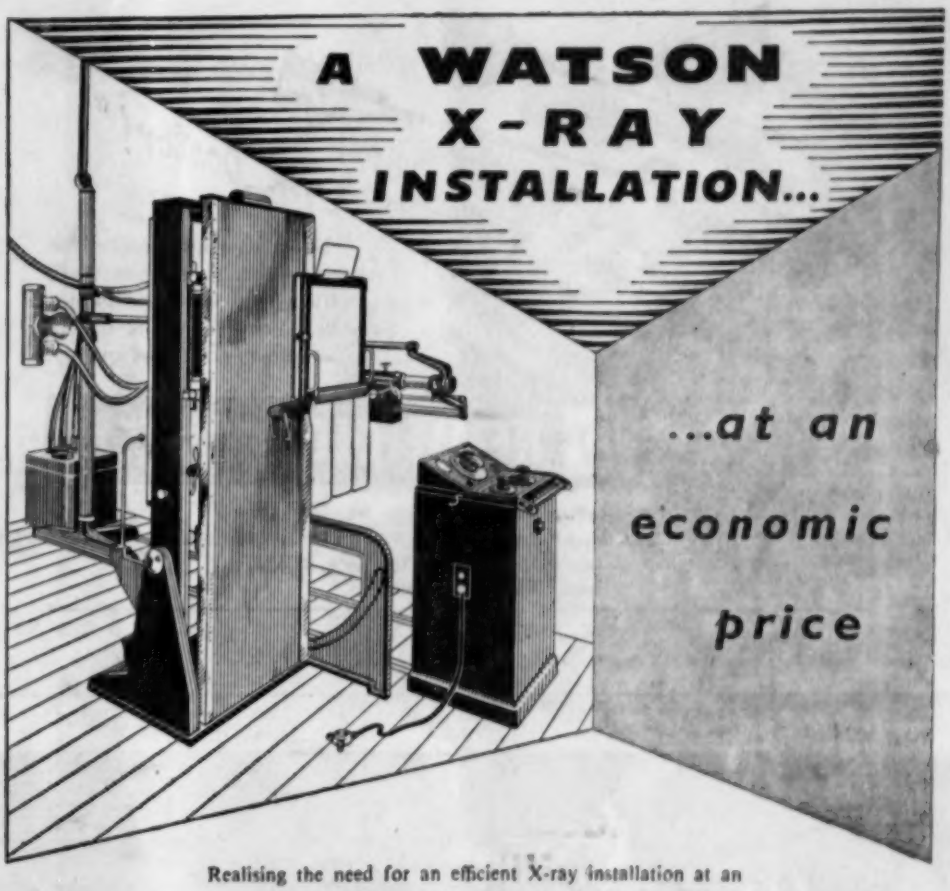

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ORIGINAL ARTICLES

EXFOLIATIVE CYTOLOGY IN BENIGN LESIONS OF THE CERVIX

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It has been recognised that one of the important features of the use of cytology as a diagnostic procedure in surgical pathology, is the possibility which it offers for detection of malignancy in its incipiency. However, with our limited knowledge in this new cytological field it is not always possible to identify the smear as positive or negative for the presence of malignant cells. Cytologic findings with strong but not fully convincing evidence of malignancy are seen. On the other hand, cells with atypical features are encountered where the structure is essentially negative for malignancy, yet these cannot be included in the group of normal cells. By far the commonest causes of such benign atypical vaginal cytology are chronic inflammatory lesions and erosions of the cervix.

A detailed study of the normal exfoliated cells and their aberrations in benign and malignant lesions of the cervix is of importance for the understanding of their specific diagnostic significance. This has been partly fulfilled as far as the cells found in vaginal and cervical smears from early and advanced cases of malignancy of the female genital organs are concerned. A number of reports have been published. Description and illustration of non-malignant epithelial cells found in various benign pathologic conditions are still far from complete. This paper is based on the study of exfoliated cells in chronic inflamatory lesions of the cervix and may be considered as a contribution towards the understanding of atypical (non-malignant) exfoliated vaginal cytology. An attempt has also been made to discuss the comparative evaluation of many aberrant types of cells found in vaginal and cervical smears in pathologic conditions.

Material and Methods

The material for the present study was collected from the out-patient departments and wards of the S. N. Hospital and Lady Lyall Hospital, Agra. This comprised 300 cases of erosion of the cervix, diagnosed as such clinically or by biopsy.

The smears were prepared and stained according to the technic already described in a previous communication (Wahi and Gupta, 1953).

Cytological Findings

Marked exfoliation of basal and parabasal cells in groups and singly is characteristic of inflammatory lesions of the cervix. The cells may look normal or present atypical features with nuclear and cytoplasmic aberrations. Besides, these smears contain an increased number and variety of inflammatory cells and red blood cells. Smears also vary in their preponderance of ectocervical and endocervical cells.

The changes seen in the basal, parabasal and the endocervical cells are the most significant. Most cells are round to oval and may show a

slight increase in the size (Fig. 1, *vide* Plate). They may occasionally acquire irregular and bizarre forms, e.g., tadpole cell with irregular cytoplasmic process (Fig. 2, *vide* Plate). These aberrant forms are seen singly or in groups (Figs. 3, 4, 5 and 6, *vide* Plate). In some cases only anisocytosis is noted while in others anisocytosis is accompanied by anisonucleosis (Figs. 5, 6, *vide* Plate). Individual cell outline is however always distinct.

The nuclei may show increase in size but nuclear cytoplasmic ratio is usually maintained due to proportional increase in cytoplasm (Fig. 1 and 2, *vide* Plate). The nuclei retain their normal structure. These may stain more deeply than the corresponding normal cell thus giving an impression of hyperchromasia (Fig. 6, *vide* Plate). Binucleated (Fig. 7, *vide* Plate) and multinucleated cells (Fig. 6, *vide* Plate) are also observed. Nuclear membrane is intact and regular. In some cells the nucleoli are distinct but there is no appreciable increase in their size.

The cytoplasm usually takes a deep basophilic stain. Small cytoplasmic vacuoles are not infrequent. Polymorphonuclear inclusions are sometimes seen (Fig. 7, *vide* Plate).

Normal cellular mitosis and the various stages of maturation and degenerations are frequently encountered giving evidence of proliferating and degenerating lesions. Darkly stained and sharply defined chromatin granules may be evenly dispersed in the nucleus (Fig. 1, *vide* Plate). In some smears the chromatin is dense (Fig. 8, *vide* Plate) and divides into fragments (Fig. 1, *vide* Plate), which may get attached to the inner side of the nuclear membrane forming a complete perinuclear ring (Fig. 9, *vide* Plate). The nuclear membrane may give way causing the dispersal of the chromatin fragments in the cytoplasm (Fig. 4, *vide* Plate). Some nuclei show the anaphase stage (Fig. 10, *vide* Plate). A cell dividing into two and each of them containing a nucleus is also seen (Fig. 11, *vide* Plate). Mitotic figures were however seen more in healing erosions.

As mentioned above, the vaginal smears in cases of benign inflammatory lesions of the cervix are characterised by the presence of an excess of inflammatory cells including histiocytes and leucocytes. Large numbers of normal degenerated superficial squamous cells are also seen. Abundant cell debris is another feature of the smear. Groups of endocervical and endometrial cells with atypical patterns may be present.

Results

Total number of cases studied were 309. Of these cases 300 were diagnosed clinically as cervical erosions and 9 were diagnosed as cancer of the cervix. Biopsy was done in 101 cases. Number of cases diagnosed cytologically: (i) of the total—187, (ii) of them with biopsy findings—98. Number of cases with atypical cells 73, and cases with marked exfoliation of basal and parabasal cells—58, number of cases where basal cells were present but few in number—157, and cases showing absence of basal cells—21.

The details of the 9 cases diagnosed clinically as cancer cervix are given in Table 1.

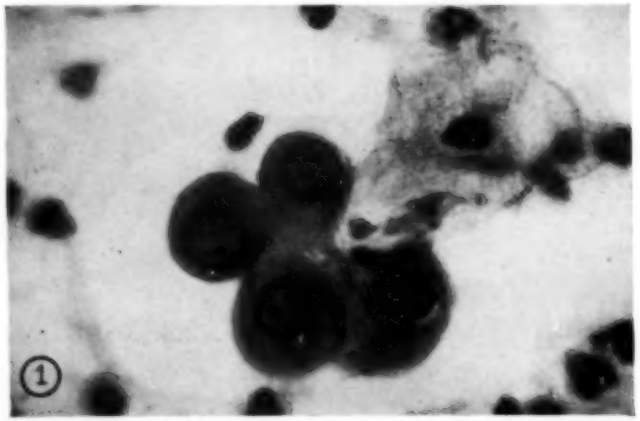
Table 1—Showing Details of 9 Cases Clinically Diagnosed as Cancer of the Cervix but the Vaginal Smears Suggestive of Cervical Erosion

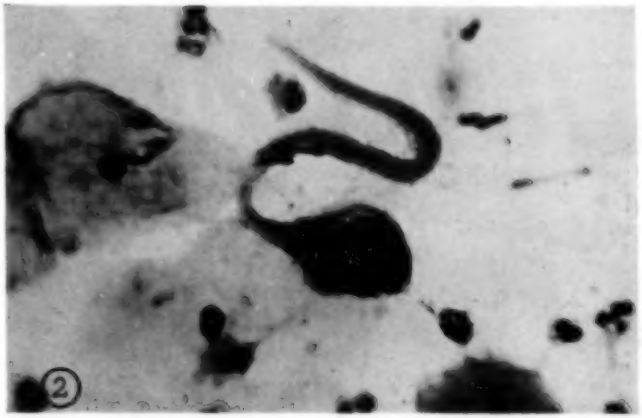
Clinical diagnosis	Smear diagnosis	Biopsy report
1. Cancer cervix	Atypical cells present	Atypical epithelial hyperplasia
2. Early cancer cervix	Occasional basal cells present	Proliferative endometrium, otherwise negative Cervical biopsy not done
3. Early cancer cervix	Occasional basal cells present	Not done
4. Cancer cervix	Occasional basal and parabasal cells present	Cervical erosion
5. ?Cancer cervix	Atypical basal and parabasal cells present	Chronic cervicitis.
6. ?Malignancy of cervix	Occasional basal cells present	Cervical erosion
7. ?Cancer cervix	Occasional basal cells present	Tuberculous cervicitis
8. ?Tuberculous endometritis ?Endocervical cancer	Occasional basal and parabasal cells present	Cervical erosion
9. ?Early cancer	Occasional basal cells present	Not done.

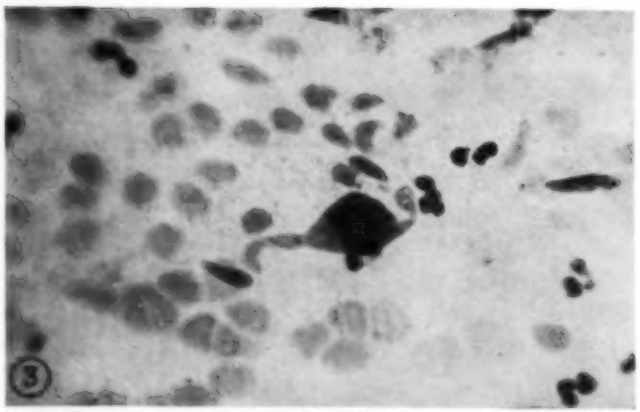
All the nine cases did not show any malignant cells on smear examination. The smear was suggestive of cervical erosion and this was confirmed by biopsy in six cases. Biopsy was not done in the remaining three cases.

Case Reports

Case 1—A Hindu female, aged 60 years, was admitted to the hospital with the complaints of pain in the legs and right iliac fossa for 1½ months. She had six full term normal deliveries, last child was born 30 years back. Vaginal examination revealed a congested cervix and







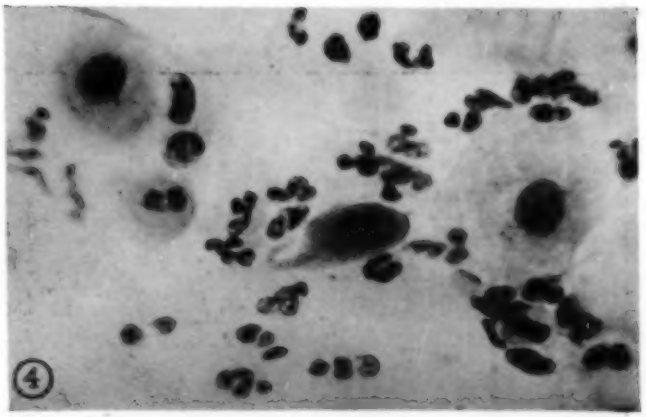


Fig. 1—Group of basal cells with distinct cellular outline showing slight increase in the size of the nuclei. Papanicolaou's staining method × 776. Fig. 2—Single basal cell taking the form of a tadpole. Papanicolaou's staining method × 776. Fig. 3—Single bizarre basal cell. Papanicolaou's staining method × 776. Fig. 4—Tailed basal cell showing clumping and dispersal of nuclear chromatin in the cytoplasm. Papanicolaou's staining method × 776.

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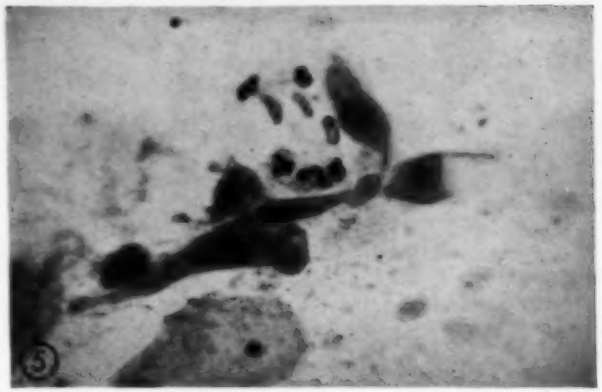

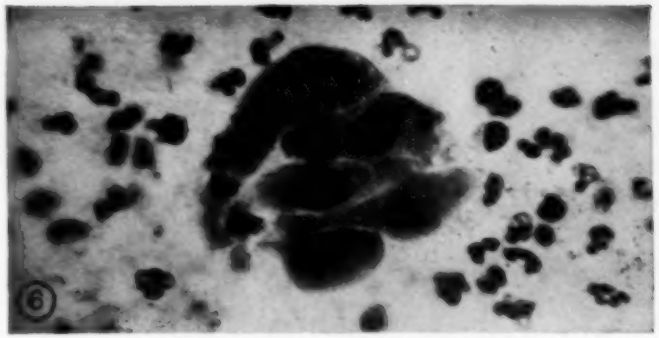

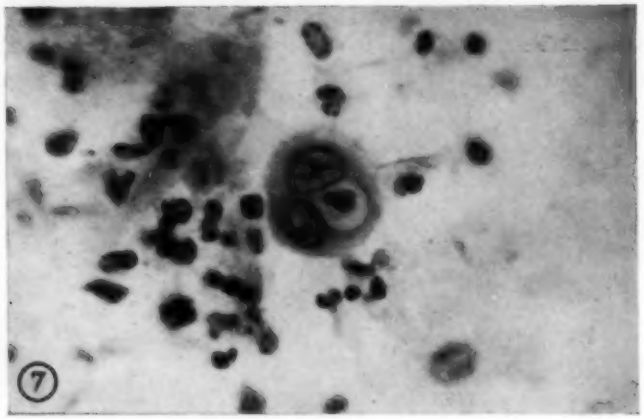

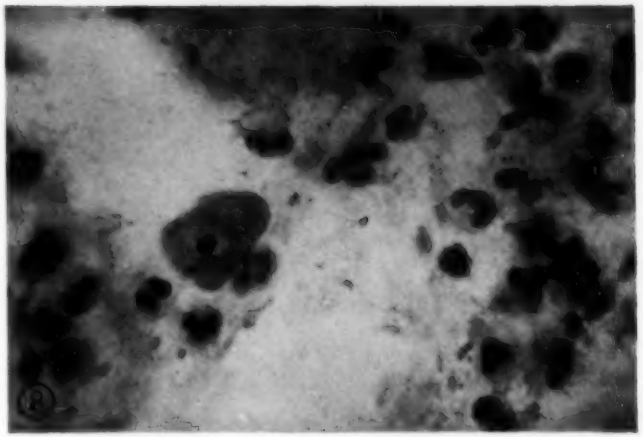

Fig. 5—Group of basal cells showing anisocytosis. Papanicolaou's staining method × 776. Fig. 6—Group of basal cells showing anisocytosis and anisonucleosis with a multinucleated cell. Papanicolaou's staining method × 776. Fig. 7—Binucleated basal cell showing leucocytic inclusion in a cytoplasmic vacuole. Papanicolaou's staining method × 776. Fig. 8—Basal cell with a pyknotic nucleus. Papanicolaou's staining method × 776.

bleeding from an area of redness. Clinically it was diagnosed as cancer cervix. Vaginal smear was diagnostic of erosion as it showed atypical basal cells. Biopsy report confirmed the diagnosis of cervical erosion.

Case 2—A Muslim female, aged 40 years, was admitted with bleeding P.V. for 15 days and pain in the lower abdomen and back. She had seven full term normal deliveries and an abortion 2 years back. Since then she was having irregular periods. On examination cervix was found patulous and endocervix firm and irregular. Clinically it was diagnosed as cancer cervix. Vaginal smear was diagnostic of erosion as it showed occasional basal cells. Histologically it was diagnosed as cervical erosion.

Comments

The most spectacular development of surgical pathology in recent years has been the use of exfoliative cytology in the diagnosis of malignancy. We feel that its greatest importance lies in offering (1) a screening test, especially when other methods of detection fail or are not available ; and (2) The possibility for detection of malignancy in its early stages. The really difficult part of this method is the interpretation of smears.

Normal smears on the one hand, and those with unquestionable malignant cells on the other, can be easily recognised. But there is a wide range of changes in which errors of interpretation are very likely. All the criteria on which diagnosis of malignancy rests will not be present in every case and some of these findings may be present in non-malignant conditions. In case of chronic inflammatory lesions of the cervix specially erosions, the nuclei may be enlarged and hyperchromatic, causing a suspicion of malignancy. Cellular aberrations, multinucleation, cytoplasmic vacuolation, anisocytosis and anisonucleosis have also been observed singly in benign atypical cells. This suspicion is still further strengthened by the marked cellularity of smears and presence of atypical clusters of endocervical and ectocervical cells. A clinical diagnosis of suspicious malignancy still makes the impression worse.

We would like to point out that we consider nuclear changes as the most important single criterion of malignancy, e.g. a nucleolus which is larger than normal (reduced nuclear cytoplasmic ratio) and shows hyperchromatism, abnormal mitotic figures and prominent nucleoli. Positivity is further assured if groups of malignant cells are encountered than if diagnosis is based on single cells. In interpreting groups of cells, variation in the size and shape of the cells should also be taken into account. If the criteria are strictly adhered to, then the histiocytes, endocervical cells and ectocervical squamous cells which are exfoliated in large numbers in cervical erosions and are often mistaken for undifferentiated malignant cells, would not offer much difficulty in correct identification.

From the present study, it is felt that cervical erosions produce certain characteristic cytologic changes. There is a marked exfoliation of basal cell clusters, some of which exhibit anisocytosis and anisonucleosis. These may show a palisade arrangement. Multinucleation may also occur in some cases. Variation in the shape of the nuclei is hardly ever noticed. The nuclear membrane is intact and regular. Macronucleosis has never been observed in benign atypical cells. The cells have a distinct cytoplasmic border. Mitotic figures are not abnormal.

The advantage of cytological diagnosis is being more and more realised as evidenced by its rapidly increasing utilisation by the surgical pathology laboratories abroad. Its greatest use is as a screening procedure for detection of early genital carcinoma in women with or without gynaecological symptoms. Unfortunately the cytology of early cancer is still fragmentary. The present study of cervical erosion has brought out the inadvisability of relying on a single criterion for the presence of malignancy. Groups of cells which show deviation from normal but cannot be classified as malignant were constantly seen. These belong to class II and III of Papanicolaou (1954). Recognition that such cells with atypical features are exfoliated from benign lesions of the cervix is essential in obviating the possibility of women being subjected to major surgery on the basis of a false positive report. However this mistake is minimised by the accepted practice of confirming the positive cytological finding by biopsy and tissue diagnosis.

Summary

Results of a study of 309 cases of erosion of cervix have been reported.

Characteristic features of benign atypical cells and their differentiation from malignant cells are discussed and illustrated.

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DIFFUSE MENINGEAL CARCINOMATOSIS†

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Willis (1952) believes that "In all kinds of secondary neoplastic disease of the pia-arachnoid, the growths may take the forms of diffuse infiltrations, multiple discrete nodules, or a combination of both. The diffuse infiltrations may vary greatly in density. They may be invisible to the naked eye and revealed only by microscopic study ; they may appear as slight thickening and the opacity of the meninges, resembling and perhaps mistaken for a chronic meningitis ; or they may produce massive tumour investment of the base of the brain, cord, and nerve roots, filling up every available crevice".

Furthermore, meningeal carcinomatosis gives no distinctive signs. It may be ushered by varied symptomatology, e.g., meningeal irritation and mental confusions (Strange, 1952), headache, weakness, and anorexia (Meissner, 1953) ; and headaches (Mallory, 1951), signs of spinal cord degenerative diseases simulating Guillain Barre syndrome in instances of intraspinal metastasis (Bozhinov and Georgiev, 1953) ; or by psychosis, hysteria, or signs of tuberculous meningitis (Willis, 1952).

This subject has been considered rather sporadically in the literature, a few of the early reports being those of Rehn (1906), Knerim (1908), Heinemann (1911) and Humbert and Alexiff (1913), who reviewed the literature. There have been occasional case reports. During the last 5 years a number of reviews have appeared (Willis, 1952 ; Strange, 1952, 18 cases ; Meyer and Reahs, 1953, 26 cases ; Meissner, 1953, 4 cases of gastric carcinoma with meningeal carcinosis). We are reporting below two such cases of diffuse meningeal carcinomatosis, which because of unusual symptomatology, could not be diagnosed during life.

† Aided by a grant from the Sidney M. Cone Research Fund.

Case Reports

Case 1—J. K., a 34 year old janitor was admitted to the University Hospital, Baltimore (U.S.A.) on May 13, 1949 with the complaints of being 'mentally ill' as reported by his sister. Until May 1, 1949 he was well. Without warning there occurred sudden personality changes, such as he would utter silly things, constantly re-arrange his clothes, would wander aimlessly and had become almost unconcerned about his personal hygiene. Sleep was disturbed as well.

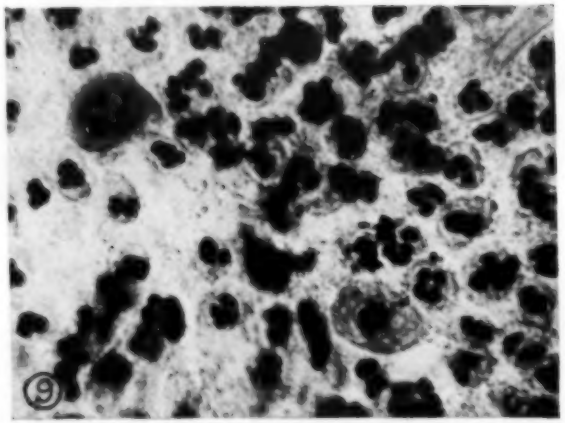
The patient was said to have had secondary syphilis in 1940 for which he was given bismuth and neo-arsphenamine injections. A week prior to his admission at the University Hospital, he was examined at another clinic where an impression of general paresis was made for which a diagnostic lumbar puncture was done. Cerebrospinal fluid examination revealed : protein 150 mg. per cent, cells 108 per c.mm., Pandy ++++, and Wassermann negative.

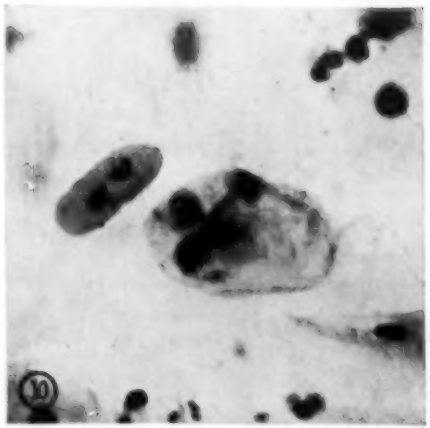
Physical examination at the University Hospital revealed a well-built and nourished, confused male, who himself offered no complaints. He was disoriented, but not violent. His speech was incoherent. Temperature, 99·4°F., pulse 69 per minute, respirations 20 per minute, and blood pressure 130/86 mm. of Hg. Examination of eyes revealed normal, central, equal pupils which reacted rather sluggishly to light and accommodation. Fundus normal. Systemic examination was noncontributory except for the presence of a few crackling rales in the left apex. Neurological examination indicated normal functioning of cranial nerves with the only exception of a suspicious right facial paresis, and slight tremor of tongue. There was marked dysdiadokokinesis and poor co-ordination. Questionable weakness of the right arm was elicited. The deep tendon reflexes were equally hyperactive on either side. Vibration sense was present.

Laboratory findings—C.S.F.—proteins 164 mg. per cent, cells 146 per c.mm. (neutrophils 66 per cent and lymphocytes 34 per cent), sugar 63 mg. per cent; globulin ++; chlorides 120 mEq/L. (about 702 mg. per cent expressed as NaCl). Culture—Negative. Guinea-pig inoculation was negative. Lange's gold colloidal test was positive 23444321. Complement fixation antibodies against the viruses of mumps and lymphocytic choriomeningitis and psittacosis group were absent in blood. Other blood estimations were within normal limits. Lungs were clear on roentgenological examination.

A possible diagnosis of meningo-encephalitis of a viral origin was made. The patient's condition remained unchanged. He was artificially fed by a stomach tube as he would not take anything by mouth. On June 15 he developed sudden massive atelectasis of the left lung and failed to respond to carbon dioxide and to penicillin therapy, and expired the next day.

Autopsy findings—The body was of an emaciated, well built male. Right lung was smaller than left and densely adherent to chest wall. Left was emphysematous. The main branches of the right bronchi were filled with purulent exudate. There was a small raw area near the commencement of the upper trunk. Right hilar and tracheobronchial lymph nodes were enlarged and they measured 1×3·5 cm. The largest showed caseous





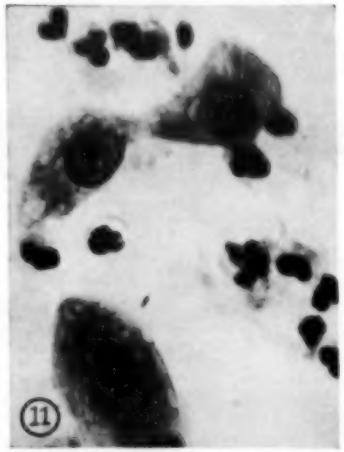


Fig. 9—Basal cell showing perinuclear ring of chromatin. Papanicolaou's staining method × 776. Fig. 10—Basal cell showing anaphase stage. Papanicolaou's staining method × 776. Fig. 11—Basal cell dividing into two. Papanicolaou's staining method × 776.

WAHI AND CHANDRA—*Exfoliative Cytology in Benign Lesions of the Cervix (pp. 385-89)*

Fig. 1 (Case 1)—View of base of brain. Note thickening of basilar leptomeninges covering cranial nerve roots. There is some opacity of the cisterna magna.

Fig. 2 (Case 1)—Coronal section through brain at optic chiasma. Note granulomatous neoplastic infiltration of basilar meninges, diffuse ependymal invasion and of septum pellucidum and corpus callosum.

WAHAL AND WAGNER—*Diffuse Meningeal Carcinomatosis (pp. 390-95)*

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Fig. 3 (Case 1)—Section showing diffuse infiltration of leptomeninges by the neoplastic epithelial cells. (×100).
Fig. 4 (Case 2)—Section showing adenocarcinomatous infiltration of the cerebellar leptomeninges. (×100).

WAHAL AND WAGNER—*Diffuse Meningeal Carcinomatosis (pp. 390-95)*

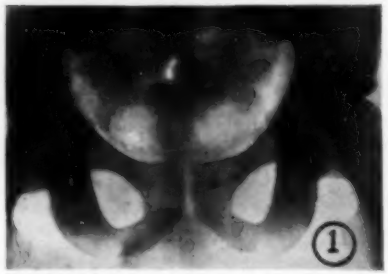
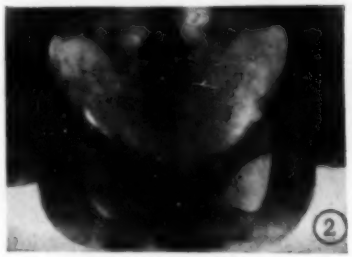


Fig. 1—The radio-opaque shadow behind the left pubic bone is a bone island and not a prostatic calculus.

Fig. 2—The radio-opaque shadow in the left pubic bone is a bone island lying apart from the catheter in prostatic urethra.



SRIVASTAVA—*Prostatic Calculi (pp. 404-08)*

necrosis. Left bronchial tree also contained purulent exudate. Left hilar glands were enlarged and doubtfully caseous. Left adrenal showed a small yellow nodule in the deeper portions. The remainder of the viscera (except brain) were normal grossly.

Microscopic examination revealed the following: the right upper bronchus presented destruction of the normal mucosa and the raw spot of the wall was completely infiltrated with neoplastic pleomorphic epithelial cells, arranged in no definite pattern. Surrounding lung parenchyma showed inflammatory changes. Left lung also showed areas of atelectasis, oedema and acute bronchitic and bronchiectatic changes. Tumour cell metastases were present in hilar and tracheobronchial lymph nodes, left adrenal, and kidney. In the latter they showed papillary adenocarcinomatous appearance.

Brain—The dura was thin, smooth and tough. The leptomeninges were congested and contained opaque creamy fluid. At the base of the brain the congestion and exudation were more pronounced, filling the cisterna and the roots of the cranial nerves. (Fig. 1, *vide* Plate I). The arachnoid membrane near the cisterna magna showed some granularity on its under surface.

A coronal section at the level of the optic chiasm showed well demarcated gray and white matter and normal lateral and third ventricles. The ependymal lining was covered by a yellowish, granular, necrotic material which was extending locally into the hypothalamus, basal ganglia, septum pellucidum, corpus callosum, and gyri cinguli. A small area 0·6×0·5 cm. in size was seen in the right claustrum which enlarged and reached the meninges at the level of the mammillary bodies. Thickened leptomeninges could be made out overlying the gyri and filling the sulci (Fig. 2, *vide* Plate). In the occipital lobe on the right side, the ependyma of the posterior horn was greatly replaced by the granular, yellowish material which extended into the centrum semiovale as well. Ventricular involvement continued in the anterior horns. Serial sections through the pons, medulla, and cerebellum showed involvement of the fourth ventricle, its choroid plexus and the meninges. Intrinsic involvement of above structures was not seen, however. Spinal cord examination was not done.

Microscopic examination—The leptomeninges, especially at the base of the cerebrum, around the brain stem and cerebellum showed diffuse infiltration with neoplastic epithelial cells, which were large polyhedral with a prominent nucleus with a well defined nuclear membrane, dispersed chromatin and a prominent nucleolus. They showed fairly marked anisocytosis and anisonucleosis but the mitotic figures were rare (Fig. 3, *vide* Plate). Small collections of cells were seen dipping into the Virchow-Robin spaces of blood vessels in the subpial regions. At places, infiltration by tumour cells was seen deeper. Sections through the region of the basal ganglia showed diffuse infiltration by tumour cells of the subependymal plate. The adjoining portions of caudate and lentiform nuclei and thalami were free from cellular infiltration and so was the insular cortex. There was diffuse ependymal involvement with infiltration into the surrounding centrum semiovale and the corpus callosum. In the occipital and parietal lobes, tumour cells were attempting to form acini and were more or less columnar in shape. Sections through the brain stem and cerebellum showed no intrinsic involvement of the above structures but there was involvement of the fourth ventricle and its choroid plexus. Pineal body showed microscopic infiltration by tumour cells.

Final anatomical diagnosis was bronchogenic adenocarcinoma (Grade IV) of the right upper bronchus associated with acute bronchitis, bronchiectasis and emphysema of the left lung; and with metastasis to hilar and tracheobronchial lymph nodes; left adrenal and kidney; leptomeninges (diffuse); ependyma (diffuse); septum pellucidum; corpus callosum; basal ganglia; thalami; occipital lobes; parietal lobe (right); frontal lobe (right); choroid plexus; fourth ventricle and pineal body.

Case 2—Mrs. A. M., a 65 year old female was admitted to University Hospital on December 23, 1948, complaining of severe headaches for the last three weeks or so. Prior to that she was well except that in September, 1948, she fell down from a ladder and became unconscious for a few minutes. The headache was not associated with nausea or vomiting or tinnitus or giddiness. It was confined to the right frontal region. There were no motor or sensory symptoms.

Physical examination—She was an obese, elderly female. Temperature was 98·6°F., pulse, 88 per minute, and blood pressure 140/82 mm. of Hg. Systemic and neurological examinations were non-contributory. No sensory or motor function impairment was noticed with the exception of a questionable deafness of the right ear.

Laboratory investigations—Cerebrospinal fluid was examined on a number of occasions. It varied from clear to slightly xanthochromic, proteins ranged from 35 to 105 mg. per cent and Pandya reaction was +. Cells numbered 10-18 per c.mm. The cell count was lymphocytes 83 per cent on one occasion and monocytes 9 per cent on the other.

Electro-encephalography indicated possible cortical atrophy with no localisation.

X-ray of the skull indicated hyperostosis frontalis interna. There was infiltration of the right lung, possibly a healed tuberculous lesion. Ventriculogram revealed internal hydrocephalus with nonvisualisation of the aqueduct or the fourth ventricle.

A ventricular puncture was done subsequent to which she developed aphasia, confusion and facial paralysis. After about 18 hours she developed continual headache to be followed by almost continuous vomiting. She collapsed and became cold and clammy and could not be revived.

Autopsy findings (Confined to brain only)—The calvarium was normal. The dura was thin and smooth on either surface. The leptomeninges were thin, delicate and congested. Two small puncture marks were seen, one in each angular gyrus. The gyri showed slight prominence with no particular narrowing of sulci. Basal leptomeninges appeared more congested. The cisterna magna appeared prominent and on the under surface of the arachnoid, a few small granular deposits could be made out over the medial portion of the cerebellum. The brain stem and cerebellum otherwise presented no other gross abnormality.

Coronal sections throughout the cerebrum failed to present any abnormality either in ventricles, basal ganglia, thalami, centrum semiovale or the cortex except for congestion and the presence of a needle tract in the right parietal lobe which extended to the splenium of the corpus callosum. Coronal sections through the cerebellum indicated a small yellowish subpial nodule, 4 mm. in size and lying in the vermis. Sections elsewhere of the cerebellum, pons and medulla showed no gross abnormality.

Microscopic examination—Sections from a number of sites indicated diffuse meningeal infiltration by neoplastic epithelial cells arranged in acini of variable size and with papillary processes projecting into them. The cells were columnar and they had prominent round nucleus and faintly acidophilic cytoplasm. There was no tendency to invade the subpial cortex, but at some places a few groups of cells were seen in the Virchow-Robin spaces. In the sections of the nodule in the cerebellum tumour cells were seen fairly deep in the cortex (Fig. 4, *vide* Plate). In sections of pons and medulla too, the involvement only of the leptomeninges was noticeable. The ependymal lining of all of the ventricles was free from tumour cell infiltration.

Anatomical diagnosis—Papillary metastatic adenocarcinoma of cerebellum, with diffuse extension to leptomeninges and diffuse metastasis to cerebral cortex (secondary); cerebral congestion and subarachnoid haemorrhage.

Discussion

Leptomeningeal implants of neoplastic cells can develop by one or more of the following routes: (a) by extension of the primary tumours of the central nervous system or the meninges; (b) by dissemination from a metastatic focus in the central nervous system; (c) by direct extension through dura of neoplasms in the adjacent structures; (d) direct extension of abdominal and thoracic tumours through an intervertebral foramen; (e) by way of perineural and perivascular lymphatics; (f) direct arterial embolisation, mostly to cranium; and (g) by paravertebral veins almost confined to spinal meninges.

Rehn (*loc. cit.*) in his case of carcinoma lung, considered the metastasis travelled to the meninges as haemic emboli or by perivascular lymphatics. Kneirim (*loc. cit.*) observed diffuse infiltration of perineural lymphatics of cranial and spinal nerves and diffuse meningeal carcinosis in a case of gastric carcinoma. Cornwall (1927), Alpers and Smith (1938) and Uspensky (1943) also observed it. The latter felt his case of pancreatic carcinoma spread along the right vagus nerve to the base of the brain and there diffuse implantation on the leptomeninges took place. Schewtschenke (1930) observed spinal metastasis of a teratoma testis and by the nature of retroperitoneal metastases concluded the growth reached spinal meninges *via* intervertebral foramina. More recently, Meissner (*loc cit.*) described 4 cases of gastric carcinoma with diffuse meningeal carcinomatoses without any deposit in the central nervous system. He was uncertain whether the metastases reached the meninges by way of perineural lymphatics or by paravertebral veins. Other workers, including Willis (*loc. cit.*), were skeptical of these modes of transmission. Willis believes that in such cases reviewed by him, a few small deep cerebral foci were present and their importance was minimized by the various workers. He conceded the only case which can overcome his objections is of Kneirim (*loc. cit.*). Meyer and Reah's (1953) observation of always finding a small subpial focus in every case strongly upholds Willis's contention.

The most common mode of transmission of carcinoma to the meninges is the instance in which there is a focus of metastatic tumour in the brain parenchyma. The focus may lie in the cortex near the meninges with cells being implanted over the leptomeninges, following its erosion into the subarachnoid space. We believe this happened in our Case 2. Duncan (1941) also found infiltration of basal meninges from a small focus in the cerebellum. In other instances the focus may lie deep in the paraventricular region and may extend upto the ventricular surface or may lie in the choroid plexus whereby the tumour cells are discharged into the cerebrospinal fluid and thus explanted over the leptomeninges, especially at the base of the brain, around the brain stem and cerebellum. This mode of transmission had been recognised as far back as 1905 when Barnes reported a case. Since then a number of workers have reported the same sequence, Hoffman (1909); Heinemann (1911), who encountered a primary metastatic focus in the thalamus; Danisch and Nedelmann (1928) who observed a primary metastatic focus in the choroid plexus of the third ventricle which initiated extensive metastasis in sheaths of cerebral and spinal nerves, and Willis (*loc. cit.*), who described a case in which the brain from outside presented the appearance of tuberculous meningitis but when sectioned, a polypoid tumour was detected in the anterior horn of the ventricle.

From the study of our Case 1, we feel that a primary metastatic focus might have existed in the basal ganglia from which seedlings implanted on the ependyma and later through the foramen of Megendie and Luschka implanted over the base of the brain, around the brain stem and cerebellum. A subpial focus (insular) accounted for

the diffuse infiltration of the overlying leptomeninges over the lateral and superior surfaces.

The sources of primary neoplasms have been varied. In the University of Maryland series of metastatic carcinomas to the leptomeninges only, the primary tumours had been in lungs (33 per cent), stomach, breast, ovary, kidney, and one case of lymphosarcoma. This had been the experience of others as well (Meyers and Reah, 1953).

The gross appearance of the leptomeningeal tumour may not be helpful in reaching a correct diagnosis and it is only the microscopical examination that can be helpful and is very well portrayed in both of our cases, especially Case 2. The difficulty is further enhanced when the patients' illness begins with ill-defined symptomatology and especially where one comes across with "negative signs" of a primary neoplasm. In such cases the examination of the cerebrospinal fluid, especially the cell count, and the nature of cells can be very informative. There are numerous reports where tumours have been diagnosed or rather suspected by the examination of cells in the cerebrospinal fluid. Humbert and Alexieff (*loc. cit.*) had observed neoplastic cells, some with mitotic figures. Then there are the observations of Meyer (1922) ; Boyd (1925) ; Duncan (*loc. cit.*) and others. Since the introduction of Papanicolaou's method of staining, the interest in cytological examination of cerebrospinal fluid has increased. Some of the reports are of Meissner (1953), Strange (1952) and Mallory (1951). The review of Platt (1951) is rather exhaustive.

In our Case 1, the cerebrospinal fluid was examined repeatedly and the diagnosis of possible metastasis was in mind. The specific cytological examination was not done in view of the fact that no unusual cells had been seen in the ordinary smear. In Case 2 it appears perhaps the significance of monocytes in the cerebrospinal fluid was not realised in view of recent history and negative lung findings. We nevertheless believe that had that examination been done, there would have been a possibility that a diagnosis of a neoplasm would have been made.

Summary

1. Two cases of diffuse meningeal carcinomatosis have been described. In both of them the symptoms and signs in no way suggested a primary or secondary neoplasm of the central nervous system. The possibility of a metastatic lesion, though held for some time, had to be given up in view of non-contributory findings of the roentgenological examinations of the thorax, and patients' histories.

2. A short historical review of the literature is presented together with a discussion of possible routes of dissemination to the central nervous system and the leptomeninges.

3. Though specific cytological examination of the cerebrospinal fluid was not done (in view of no unusual cells having been found in fluid), this examination should be carried out as a routine in every unusual neurological case where there is pleocytosis in cerebrospinal fluid.

4. It is suggested that whenever a patient is seen with peculiar or atypical symptoms and signs of neurological disorders, the possibility of neoplastic disease of the central nervous system and/or its meninges must be kept in mind.

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ELECTRORETINOGRAPHY IN INDIA

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Electroretinography is a subject which has attracted active attention rather recently. There have been references in the literature, the earliest being that of Holmgren (1865-66). The first record of action current potential from the human eye has been attributed to Linsley and Hunter (1939).

Electroretinography has rapidly sprung up into prominence during the last few years as a result of extensive investigations on animals and human beings, the notable workers in recent times being Karpe (1945, 1948a, 1948b and 1949), Granit *et al* (1936), Tansley (1936) and Henkes (1954).

Extensive work on clinical electroretinography has conclusively proved the prognostic and diagnostic value of the method in various ophthalmic conditions where the functions of and disturbances to the retinal structures are concerned. The useful application of electroretinography in conditions like siderosis bulbi (Karpe, 1948b and Karpe and Vainio-Mettila, 1951) has been explained.

On the basis of discussions regarding dynamics of intracapsular cataract extractions by Goldsmith (1943), Kirby (1949) and Harrington (1951), stimulus to further application of electroretinography to clinical ophthalmic conditions like cataract has been provided (Vail, 1952).

Its application has now been established in various condition where one wants to know the functioning capacity of the retina, more particularly the rod cells but cannot directly examine the fundus due to opacities in the media or gross pathology in the anterior segment of the eye.

In this country clinical application of electroretinogram to cases of vitamin-A deficiency, cataract, glaucoma and detachment of retina has been continuing since 1952 and is being carried on under the auspices of the Indian Council of Medical Research at the Cardiology Department of Mahatma Gandhi Memorial Medical College, Indore (Madhya Bharat).

Principles of Electroretinography

Electroretinography records the action potential of the retina when the later is stimulated.

Systematic studies, from the point of view of the component analysis of electroretinography, have distinguished two types of retinae called E and I. All mammalian retinae, hitherto known, are E-retinae. The mammalian retinae are dominated by rods. The only pure cone retinae, hitherto studied, are pure I-retinae, and have all been found in cold blooded animals. Human retinae belongs to E-type.

For the present it is enough to say that the chief difference between E and I-retinae is the much larger off-effect found in the latter. Generally, too, this type has a larger a-wave and these distinctions become still more marked after light adaptation. It seems probable that it is the difference in the interplay of the component potentials that is responsible for the differences observed in the electroretinogram obtained from E or I-retinae.

The diagrammatic tracing of a typical electroretinogram of the human being (Fig. 1), show an

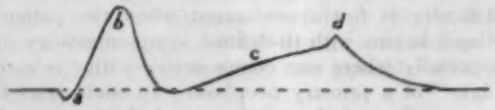

Fig. 1—Showing Normal ERG (Diagrammatic).
a—initial negative; b—main positive; c—slow secondary rise; d—off effect.

initial small negative phase, called the a-wave. Then follows a positive peak that flattens out at lower stimulus intensities and is called the b-wave. At sufficiently high stimulus intensities, a secondary rise, the c-wave, succeeds the b-wave. Finally, at cessation of illumination, there is a small retardation, the off-effect or d-wave, which is hardly visible at lower stimulus intensities.

The electroretinographic response has been established to be an algebraic sum of at least three component potentials as a result of investigations by Granit who with the use of anesthetic and other drugs has been able to establish the identity of each component element. These components are represented in Fig. 2.

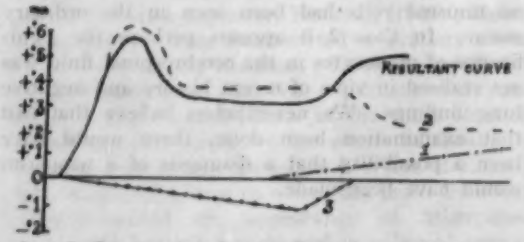

Fig. 2—Showing Component Parts of an ERG and the Resultant Curve.
3—negative a-wave; 2—main positive b-wave; 1—secondary rise of c-wave.

The a-wave is part of the large negative component P 3 which continues for the whole period of illumination. It has a briefer latent period than the positive component P 2 that is responsible for the b-wave. The late secondary rise, due to com-

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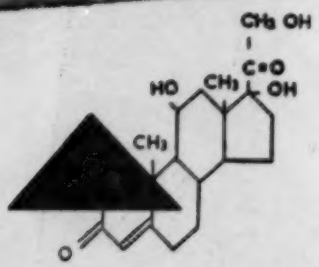

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ponent P 1, as well as the off-effect can be avoided if brief flashes be used as stimuli. Then the electroretinogram is relatively simple and merely consists of an a-wave succeeded by b-wave, the latter, of course, being an algebraic sum of the two opposite potentials P 3 and P 2.

More recently views have been expressed that the a-wave predominantly represents the cone function and that is why it is more prominently observed in photopic electroretinogram. The c-wave has been attributed to the pupillary action following the main b-wave. It this boils down to this that the height of the b-wave is result of composite response of the retina as a whole and represents the functioning capacity of the rod cells in particular in a scotopic electroretinogram.

The observations in electroretinography are therefore, aimed at studying the relationship of the height of b-wave of an electroretinogram of a dark adapted eye in relation to a particular clinical condition.

Electroretinogram is a very useful means of assessing the condition of the retina in cases of cataract where direct observation on fundus is not practicable and because P.L., P.R. cannot be solely depended upon to assess the correct prognostic state before operation.

The Apparatus and Method for Clinical Recordings of Electroretinogram

The method adopted in these investigations is exactly the same as by Prof. Karpe of Sweden with only one exception that the amplifier used here has a sensitivity of one millivolt=1 cm., instead of 1 millivolt=2 cm.

The active electrode consists of a chlorinated silver rod screwed into a bottleneck in a plastic contact glass. The glass is filled with normal saline and adjusted well over the centre of the cornea. The indifferent electrode is a chlorinated silver plate fixed to the inside of a plastic head band and applied to the patient's forehead. This head band also carries all the leads from the patient to the amplifier. In addition to the two leads from the electrodes, a third connects the spring speculum used to keep the patient's eyelids apart, to the metal shielding of the apparatus. This connection is most important since it provides adequate neutralisation of active interference so that, as a rule, the electroretinogram can be taken in an ordinary dark room. This is, of course, a very great practical advantage.

Obviously complete freedom from the effects of extraneous electrical disturbances cannot be guaranteed under all circumstances. Diathermy apparatus, arc lamps, short wave radiation and even the usual alternating current are liable to cause trouble and for this reason any wires carrying current to the flex of the stimulating lamp are to be kept away from the patient.

The stimulus is provided by an electric bulb connected to a relay which lights it for ¼ sec. It gives a convenient standard illumination of about 80 Lux on the eye. The intensity produced by incandescent bulbs, even of the same theoretical wattage was very variable and it was, therefore, absolutely necessary to calibrate each new bulb before use and desirable to repeat the calibration at intervals since the bulbs deteriorate with use. In each case, distance was so adjusted and measured that the luxmeter gave the desired value of 80 Lux. A faintly glowing red light constantly fed by a weak current through a transformer was fixed on the wall to serve as a fixation point, thus minimising disturbances on the record caused by eye movements.

The calibration device is built into the apparatus together with a voltmeter which can be used for controlling this.

Analysis of the Work Done

Under standardised conditions, the height of b-wave gives the functioning condition of the layers of retina, more so of rod cells, in scotopic eyes, a-wave being more due to associated factors.

The average height of b-wave obtained in 33 eyes, works out to be equal to 0·32 mV. The normal electroretinogram tracings recorded at the Mahatma Gandhi Memorial College, Indore, with the help of electrocardiograph are of the same typical pattern as those recorded by the pioneers in the work. The average b-potential of a normal Indian adult (Fig. 3) is 0·32 mV. and that of a child (Fig. 4) 0·26 mV. below the age of 7 years.

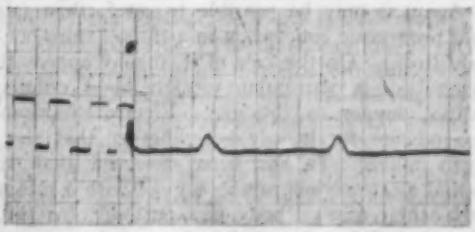

Fig. 3—Normal ERG of an Adult.
Average b-potential 0·30 mV.

Electroretinogram can be a very useful means of determining the prognosis of cataract before operation because ophthalmoscopy is not possible and the existence of P.L. and P.R. cannot always be relied upon. It has been observed that the

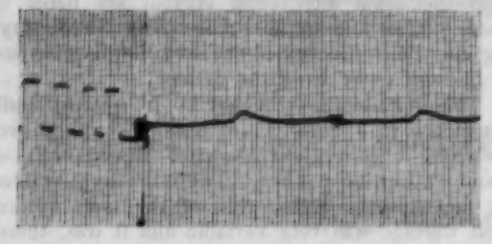

FIG. 4—NORMAL ERG OF A HEALTHY CHILD UNDER GENERAL ANAESTHESIA.
Average b-potential 0·225 mV.

height of b-wave is nearly normal even though there may be mature cataract. This proves that a minimum light passing through the eye diaphragm is enough to bring about the retina in full activity and also proves that it is not necessary to focus the light on macular area alone. An electroretinogram is thus a composite response of the retina and is an indication of its functioning capacity rather than of a structural or pathological change.

Similarly observations have been reported where an electroretinogram was subnormal in one eye with macular degeneration but also subnormal in the other eye with a healthy macular area, again indicating that subnormal state of electroretinogram was not due to a particular change in the macular area but represented the function of the retina as a whole.

Electroretinogram is a very valuable means of assessing the prognosis of detachment of retina. A markedly subnormal electroretinogram will indicate that there are very poor chances of retina regarding its function even though it may get reattached, while, on the other hand, respectable height of b-wave would indicate a happier prognosis.

Again it may be possible to set forth a fairly clear prognostic conception in a case of intra-ocular body (iron). On the face of it, it may appear that removal of a particular foreign body entails a distinct danger to the eye. Electroretinography can indicate far in advance whether that risk is worth taking. It has been observed that subnormal electroretinogram in an eye with a retained intra-ocular foreign body is a portend of a future siderosis bulbi and complete loss of that eye. In such cases a proportionate risk in the removal of foreign body would be better than ultimate complete loss.

Electroretinogram has thus a very much wider clinical application in physiology and pathology of human body and specially the eye. Its main value at the moment appears to be from prognostic and diagnostic points of view where its importance may be invaluable.

ACKNOWLEDGMENT

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REFRESHER COURSE

INFECTIONS OF FINGERS AND HAND IN GENERAL PRACTICE

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The advent of sulpha drugs and penicillin and the introduction of broad spectrum antibiotics have opened new vistas of conservative treatment in infections of the fingers and hand. General practitioners now rarely have to send these patients to hospital even though it may be convenient to do so. Besides, the general practitioner always has the first opportunity of starting the treatment early in these cases and obviating an operation which, to say the least, may be mutilating.

In spite of this, there is no scope for complacency. The importance of early diagnosis cannot be overemphasised and the fundamental principles of surgery of infection stand. The limitation of sulphonamide and antibiotic treatment is that

they are valid only for the common organisms which are sensitive to them. The risk of serious complications still exists in occasional cases in which the infection is resistant to the drugs used. One should be on the look out for such cases, and submit them to the investigations which can be carried out only in a hospital where an early and quick diagnosis of the malady can be made and treatment instituted. This procedure will prevent avoidable disability of the limb.

Sites of Infection

Cutaneous and subcutaneous infections in the pulp spaces are the commonest. They are due to *Staphylococcus aureus* which is introduced by a minor injury. Infections of the tendon sheaths, joints and bones have become less common as complications of superficial infections, but they still occur frequently enough in industrial society due to trauma. The treatment of these is best carried out in a hospital and need not therefore be described here.

The cutaneous and subcutaneous infections which will be described here are as follows:

(1) Paronychia (infection round the base of the nail);
(2) Pulp space infections of the terminal segments of the fingers and thumb;
(3) Infections of the volar aspect of the proximal and middle phalanges;
(4) Infections of the interdigital webs;
(5) Carbuncles of the hand and the back of the fingers.

Paronychia—The infection as a rule starts due to careless nail paring; commences in the fold of the nail and travels round the three sides (two lateral aspects and base of the edge of the nail). If not treated properly in time, pus may track under the nail and may even go deep into the pulp space and ultimately into the tendon sheaths. Severe pain due to tension is not a prominent symptom of these infections. Mild cases will subside with rest and penicillin injections. If however pus forms, which may be evident from throbbing pain, discoloration of the skin and increased swelling, resort to surgery will be necessary.

Pulp space infections—The infection of the pulp spaces of fingers results usually from direct trauma. Occasionally the cause may be systemic infections like diabetes, nephritis and chronic ill health.

Very severe pain is a common feature of these infections, because the pulp spaces are rigid and there is high tension in the region enclosed. Pain can be so severe that the patient loses his sleep. He may run a high temperature. The depth at which infection has started will have a bearing on the treatment. Pus, even though none may be visible, is usually present when the patient seeks treatment.

Exhibition of penicillin will abort the infection in some of these cases, if seen very early. However penicillin will help to localise the infection and prevent it from spreading farther to the tendon sheaths or bone. Once the infection has localised and formed a local abscess, pus will have to be let out.

Infection in other areas may manifest itself as a subcuticular blister either as a whitlow or as an infection of palmar spaces.

The subcuticular pus may be connected with the pus which is deeper than the skin in these conditions. Removal of the cuticle will show a hole which connects with the pus which is situated deeper. Since treatment with antibiotics has been accepted in these cases, it is suggested that no harm results from waiting in all these cases till pus in subcuticular tissue is seen. While this may be true in most cases, time may be saved by anticipating this condition. Because, individuals who have a thick horny layer of skin which does not readily yield, will retain pus under great tension, causing very severe pain with disability which is prolonged. In these cases early surgical intervention under penicillin cover will bring about quick healing and early restoration of function. It is well known that delay in healing after an abscess is opened is due to the pressure of adherent slough. One also knows that slough separates more readily if it is bathed in pus, but when an abscess has formed there is no way of telling whether there is adherent slough. The only way is to open it and see.

Interdigital web infection or collar stud abscess of the palm—These are caused mostly by pricks and abrasions. The manifestation, is in the form of a swelling of the adjacent fingers and dorsum of the hand which distends the depression in the web. It is moderately painful. If penicillin does not cause it to subside quickly, pus which forms early should be evacuated by an incision as early as possible, because it is likely to spread to the palmar space.

Infection of tendon sheaths—Infection occurs from direct injury, usually at the creases, or may take place as an extension from superficial infections. The spread of infection is as a rule rapid and continues up to the crease at the base of the fingers particularly to the second, third and the fourth where it stops. In case of the thumb and the little finger, the radial and ulnar bursae get inflamed. There is a very tender fusiform swelling of the

finger which is held in flexion. Extension is extremely painful and is resisted. The maximum point of tenderness is situated at the base of fingers in the palm. In ulnar bursitis there is acute swelling and pain on the medial side of the palm and the little finger is fixed and extension is extremely painful. There is also pain on the medial aspect of the wrist and the wrist is held in flexion.

In radial bursitis the infection spreads from the thumb and the swelling is marked on the thenar eminence and on the radial side of the wrist. There is also swelling and oedema on the dorsum of the wrist and hand.

These are serious and disabling infections. For successful treatment the patient should be sent to a hospital as soon as diagnosis is made.

Carbuncle of the fingers and dorsum of the hand—This condition is more common in middle-aged people who are either diabetic or are suffering from chronic renal diseases. At first there is a diffuse swelling with severe pain. The swelling after a time has a number of openings on it, discharging small quantities of pus. When pus is wiped off, slough which is sticky is visible underneath. The slough separates early if it is bathed in pus. It is because of this that early incisions should not be made in these carbuncles. Treatment with penicillin frequently repeated in early stages, and with procaine penicillin when swelling is localised, together with application of heat by means of short wave diathermy or infra-red rays will bring about discharge of pus and slough. Once the diffuse swelling has localised the patient should be encouraged to carry out movements of the fingers and wrist.

Palmar space infections—There are two palmar spaces—thenar space and the mid-palmar space. The mid-palmar space is affected from the infection from the sheaths of the third, fourth and the fifth fingers or from a direct piercing injury or *via* the lumbrical canals.

The features are: (1) swelling of the palm and the dorsum of hand, and obliteration of the hollow of the palm with very severe pain; (2) slight flexion of fingers which is not necessarily very painful; and (3) a general reaction in the form of fever with malaise. The treatment of this is carried out, first by injections of penicillin which may have to be repeated more frequently in order to get localisation. These patients must be sent to a hospital.

Thenar space infection takes place as an extension from thumb and index finger infections or from direct trauma. The swelling is seen under the thenar eminence and obliterates the first dorsal interosseous space. Diagnosis is as a rule obvious and the best way of treating this is by an incision on the dorsum longitudinally, under cover of antibiotics.

Treatment in General

At whatever stage the infection is seen in the fingers and hand, antibiotics should be given, even though operation may be decided upon.

Penicillin which is the most useful antibiotic for these infections may be used as a slow acting procaine preparation in a daily dose of 4,00,000 units. If early operation is decided upon, the crystalline preparation may be injected for a quick effect an hour or two before operation. It is better to wait for a few hours than to operate without antibiotics. In those cases of spreading infections, like lymphangitis with severe constitutional signs, penicillin will have to be given more frequently and in larger doses, generally 500,000 units of crystalline penicillin every four hours in order to get localisation of the infection. Once the infection is localised, slow acting penicillin may be used. In these cases it is also necessary that the patient is kept at rest in bed and the hand is elevated on a pillow if there is much swelling. The patient generally requires 3 to 4 days' penicillin treatment before the general signs subside and the infection is well localised. Till this happens it is a good rule to splint the hand and the forearm and keep it in a sling. Most infections of the hand are very painful. In order that the patient gets rest and sleep he should be given analgesics like aspirin, codein and even morphia. Except in cases of paronychia where an early operation avoids removal of the nail, an operation should not be undertaken until the infection gets localised.

From the outset it is understood that a general practitioner is going to treat most of these cases single handed. For this reason local anaesthetics have to be used in all cases. Since the doctor works single handed, his preference to general anaesthesia is a matter of convenience. If the general practitioner can get the help of an anaesthetist to give general anaesthesia, there is no objection in using general anaesthesia, and it should be used if multiple incisions have to be made or if the incisions are to be made in the palm, because, for these local anaesthetic has to be given at the wrist. This needs time and an accurate knowledge of the technique of injecting the nerves at the wrist. Treatment of infections of tendon sheaths and palmar spaces should be treated by a surgeon in a hospital.

The various incisions used are as a rule simple and the time required to master them is not long.

They are best understood from the illustrations (Figs. 1-4) with descriptive notes.

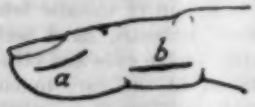

FIG. 1—INCISIONS *a* AND *b* ON THE SIDE OF THE FINGER FOR WHITLOW OR PULP SPACE INFECTION ON THE TERMINAL AND MIDDLE PHALANX.

FIG. 2—WHEN PUS HAS SPREAD TO THE WHOLE PHALANX, INCISIONS ARE MADE ON BOTH SIDES OF THE FINGER AND A PIECE OF GAUZE PASSED FROM ONE SIDE TO THE OTHER FOR DRAINAGE.

N.B.—The tip of the finger should be left in tact as it is the site of the fine sense of touch and a scar at the tip is invariably painful.

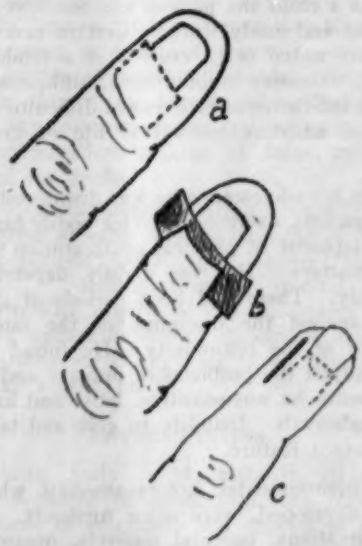

FIG. 3—*a* AND *b*—INCISIONS AND DRESSING FOR PARONYCHIA. IF PUS HAS TRACKED UNDER THE NAIL EDGE, THE POSTERIOR END OF THE NAIL SHOULD BE CUT OFF. *c*—WHEN PUS HAS SPREAD TO THE SIDE OF THE FINGER, THE LATERAL INCISION SHOULD BE MADE.

FIG. 4—*a*—LONGITUDINAL INCISION FOR LATERAL PALMAR SPACE INFECTION. *b*—INCISION ON DORSAL ASPECT FOR LUMBRICAL SPACE INFECTION. INCISION COULD ALSO BE MADE JUST OPPOSITE TO IT ON PALMAR ASPECT FOR COLLAR STUD ABSCESS. THE WEB SHOULD NOT BE CUT.

Local anaesthesia: (1) For a digital nerve block a subcutaneous injection of 1 c.c. 2 per cent procaine on each side of the finger at its base near the web is sufficient. No adrenaline should be used. (2) For a nerve block at the wrist: 2 c.c. of 2 per cent procaine solution with adrenaline is injected round the median and the ulnar nerve at the wrist and 2 c.c. on the dorsum of the wrist to block the radial nerve.

It takes about 10 minutes for the anaesthetic to take effect. In order that there is not too much blood to obscure the field of operation, a tourniquet—preferably a sphygmomanometer cuff—is used to get a bloodless field. When one has gained experience even this is not necessary. The aim of surgery is to let out pus, by an adequate incision and get early healing. Under no circumstances should incisions be made across the creases or in the centre of the volar or dorsal aspect of the fingers. If incisions are made on the palm, incisions along or parallel to the creases are practical and will not leave a painful scar. Care should be taken to see that the radicals of the palmar arches and nerves are not injured. Drainage by rubber tubing or rubber tissue is not required. At the most a small piece of dry sterile gauze or gauze soaked in 1 per cent acriflavin solution is introduced in the wound for a day or two to see that the wound does not close at once.

Post-operative care—Fomentations applied every six hours will take away most of the swelling and pain. If swelling is great, elevation of the hand on pillows and even application of plaster splint to give complete rest, may be necessary. Movements of fingers and joints are encouraged as soon as general reaction has subsided. If temperature persists, injection of penicillin should be continued till the temperature remains normal for at least 48 hours. Treatment should be deemed successful if fingers and hand regain normal function and no painful scar is left.

SCHIZOPHRENIA

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Of all forms of mental disorders schizophrenia has special importance. Cases are very frequently met with in practice, present innumerable clinical pictures and are deep seated disorders of thought processes and topical functions.

The main characteristics are: (1) odd, twisted and incongruous actions and (2) immature reactions. More common expressions of these disordered actions and reactions are:

(*a*) Thought processes are loaded with vague day dreamings and fancies, unrealities are taken uncritically as realities, a feeling of being influenced by other persons or objects, a tendency to see fancied and hidden meanings in the behaviour and utterances of other persons. Persecutory ideas and delusions may be present and these delusions are either poorly or fairly well systematised. Hallucinations (sensory experiences for which the sources of origin of stimuli cannot ordinarily be ascertained) may be present. Auditory hallucinations are common. Language may suffer in form.

(*b*) Emotionally they react inadequately or incongruously, the usual shallow affects blend inadequately and inappropriately with the existing circumstances and thought contents.

(*c*) The pattern of behaviour may be disordered, motility may be disturbed, giving rise to states of peculiar waxy rigidity, to states of stupor and to that of excitement.

Complaints

Almost all patients who seek help themselves complain of symptoms referable to the gastrointestinal tracts, e.g., epigastric pain or discomfort; nausea; constipation, often alternating with diarrhoea-like attacks; and apprehension over the status of the cardiovascular functions.

More frequently they complain of somatic sensations (e.g., skin disorders, sinusitis, head feelings, tight or drawing feeling of the eyes and other vague complaints in relation to the ear, touch, etc.); variations in physical functions (e.g., sensations and functional variations of the genitals—specially in males; menstrual irregularities, amenorrhoea, frequency of micturition—in females).

Less frequently they complain of some queer and disturbing thoughts and convictions or of some emotional states experienced.

Occasionally at the onset, difficulty in thinking, in concentrating and in carrying out routine responsibilities in a satisfactory way, are complained of. When the relatives give the story they usually emphasise the above items and indicate a real personality disorder as seen by some of the characteristics.

History

On indirect examination (from information from the relatives and friends) certain facts of history are obtained that help to evaluate the tendencies giving rise to inadequate reactions. The facts obtained from the history are as follows:

(1) As a child the patient was sensitive, quiet, shy, timid and easily scared. Certain neuropathic traits were noted (e.g., cruelty or a tendency to be cruel, excessive stubbornness, sulkiness). All these are indicative of progressive difficulties in the patient of adapting himself to life in the usual way.

(2) In his adolescence he was disinterested, unduly suspicious, overconcerned for bodily functions, for development of physical configuration and for health matters. He was unduly dependent on the family. There had been periods of stubborn revolts against the discipline of the family, of school or of the community. He found it difficult to adjust the problems of puberty and adolescence, hence he was sensitive, tense and had emotional upheavals. Inability to give and take with others was a feature.

(3) Environmental factors amongst which the patient developed, were often unsteady. Broken home situations, parental quarrels, oversolicitude by parents, parent's ambition not based on child's capacity, rigid ideologies of the home, are factors that tell upon the growing child who is trying to take part in the group, in vocational and educational activities.

Mental Status

Incongruity of affect (emotional matrix) and thought content—The subject feels happy and acts so while he believes that he is tortured; smiles and laughs without cause; rapid changes take place of hate to affection, of pleasure to displeasure or *vice versa*; there is an apparent lack of feeling or emotional response; impulsive emotional outbursts for vague or for slight cause; inadequate blending of likes and dislikes; mood swings from depression to elation or otherwise.

Disorder of thought contents—Ideas of reference (feels that actions of others have some personal meaning for him) and passivity feelings (feels that he is controlled or being influenced by other persons or forces, is hypnotised and is made to do things against his will; having his mind read). Hallucinations, usually auditory and visual, often olfactory, gustatory and tactile. Believes that he is undergoing some mystical and fantastic religious experience, suggesting that he is appointed for a special mission in life, has salvation like experience in which self mutilation may occur, in order to be "reborn", "cleansed of sins", "admitted to heaven"; he has some great invention or power. Persecutory ideas of being tortured by infernal machines, telepathy, enemies, poison being administered in his food and drink.

Disorder of speech and other symbolising functions—Blocking of thoughts and speech as observed by unaccountable interruption in patient's talk, creating a chain of repeated sounds and words, jumble of unrelated words, using coined words or phrases, incoherent and irrelevant utterances. Strange mannerisms and action as observed by meaningless making of faces and movements of the limbs.

Motor disturbances—Staring; standing and maintaining awkard and uncomfortable position for long periods; stereotyped actions; impulsive outbursts of actions (hurling oneself against walls, throwing objects at others, setting clothes on fire); hyperkinetic and disjointed display of symbolic movements (fighting in air, driving car, flying like a bird, etc.).

Physical Status

Dysplastic body build, asthenic, ill proportioned; evidence of infantilism and incomplete development of secondary sex characters may be present; menstrual disturbances; skin is susceptible to changes of tone and resistance and present seborrheic phenomena. Vasomotor instabilities like cold extremities; labile cardiovascular functions, palpitation, pale or blanched look are also present.

Variations in the motility and secretions of the gastro-intestinal tract may happen. Metabolism is disturbed. Lack of appetite and lack of sleep are observed. B.M.R. is reduced. There may be changes in blood chemistry, haemopoietic reactions and immunity reactions. Neurological findings are usually negative.

Clinical Types

Clinical pictures are numberless. Usually there are certain common features which enable one to form sub-types. Four types are described, but there are considerable overlappings.

Simple type—(*i*) There is a gradual slump in interests, decline in ambition, withdrawal from family and social contacts.

(*ii*) Persistent tendency to glide into a state of profound listlessness and apathy; prone to deteriorate.

(*iii*) Delusions, hallucinations, and any great degree of irregularity in thought process are absent.

Hebephrenic type—(*i*) Onset usually at about puberty.

(*ii*) Day-dreaming and regression to childish behaviours, e.g., whining, tantrums, giggling, baby talk, indifference to spontaneous activity.

(*iii*) Peculiar mannerisms and movements.

(*iv*) Unfixed non-systematised delusions, and hallucinations of being accused of crimes, of seeing grotesque and symbolic pictures and scenes.

(*v*) Outstanding feature of thought and behaviour are, silly, incoherent and scattered.

Paranoid type—(*i*) Frequently seen in adult persons (after or about 25 years of age).

(*ii*) Markedly preoccupied in illogical, loosely systematised and odd delusions of being followed, watched and persecuted; of being influenced by hypnotism, electricity, spells, atomic energy from distance, and action of others; of having his mind read; of depersonalisation (*i.e.*, being God, great man, dead person, being animal, etc.); of being distorted.

(*iii*) Frequently appropriate and vivid hallucinations are present of hearing, smell and vision.

(*iv*) Resulting overt behaviour is odd, inconsistent and fantastic.

Catatonic type—(*i*) Less frequent than other types.

(*ii*) Profound withdrawal from reality, so much so that the biological contacts with environment are partly eliminated. Common expressions of this withdrawal are, mutism, non-response to stimulation of any kind, refusal to act, retention of urine, faeces and saliva.

(*iii*) State of profound tenseness, maintaining fixed posture for a long time, apparently without fatigue and resistive to passive movements.

(*iv*) Stereotypy, i.e., monotonous repetition of phrases and words, abstracted and detached from their original meaning. Echopraxia (imitation of actions of others, without meaning) and echolalia (imitation of speech of others without meaning) may be present.

(*v*) Outstanding negativism, the common expressions of which are: retention of excreta, refusal to eat, doing the opposite of what one is asked to do.

(*vi*) Violent outbursts of excitement are quite common. The patient may be dangerous to himself and others; difficult to be controlled.

(*vii*) Stupor is very common. Stupors are states of reduced psychobiological responsiveness of intrapsychic origin, characterised by blankness, apparent absence of effect and spontaneity, variation in muscle tone from relaxation to tenseness without restlessness; relatively little change in respiration or in circulation, unless affected by emotional upheaval or postural peculiarities.

(*viii*) Period of release (lucidity) of variable durations occur, when the patient is able to make effective contact with reality.

Aetiology

Theories relating to heredity, degenerative factors, organogenic factors, biological factors, have been mentioned. They really fail to explain.

Psychopathology. These individuals gradually replace their contact with reality with day-dreaming, hence fantasies go unchecked and ambitions unrealised.

Uncontrolled autoerotic and other sex activities, that are in conflict with standards, if accumulated often lead to inadequate habits of conflicts, inadequacy feelings, inadequacy reactions and false over-compensations.

Course and Prognosis

The changes are inclined to develop gradually and very often burst suddenly, if the patient is in a situation that he cannot cope with successfully or squarely.

Some are episodic and tend to occur in attacks—these are less frequent. Many are progressive, at least the patient remains stationary in a low level. Spontaneous remission and readjustment occur infrequently. Improvements are more frequent in cases of stupor and catatonia. Deterioration and delapidation may be the end-result in any of these.

Treatment

The treatment is a matter of understanding the personality make-up, his assets and handicaps, and modification of the environment to reduce irritations and failures. If manageable under home conditions, the general physician is important and is able to aid materially, because he is the person who detects the disease early and understands him better. There are cases in which treatment with the help of the familiar general physician is more profitable than the care of a psychiatrist in an institution.

Special treatments: They are more or less empirically given and seem to improve the condition of some, and to hasten some remission by improving his touch with reality. Insulin shock treatment and electric convulsion therapy are mainly used. Hypnotics like barbiturates are used to combat insomnia and restlessness. *Rauwolfia serpentina*, powdered total root is very effective in producing sleep and sedation.

Refusal of food is very troublesome. The patient may remain without food and drink for days together, even actively throws out any nourishment that is introduced into his mouth. Electric convulsion treatment is very effective in these cases; at least it tides over the situation. The patient resumes taking of nourishment and sleeps better after one to three convulsions. Nasal feeding may have to be resorted to in intractable cases.

On recovery re-education is necessary for the patient to live more economically and comfortably on a plane to which he is adaptable.

SPECIAL ARTICLE

PROSTATIC CALCULI†

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Much is known about renal and bladder calculi but little importance is attached to prostatic calculus which is not so rare as is generally thought of. If a routine investigation is made and an x-ray of the region of the prostate is taken a large proportion of cases of prostatic calculi associated with some abnormal pathology of this gland will be recognised.

† Paper read at the U. P. Medical Conference at Aligarh.

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Though cases of prostatic calculi have been reported and their pathogenesis and symptomatology have been discussed by older authors, the importance of this clinical entity has been recognised only in the past two decades. The urologists have been putting great stress in the diagnosis of prostatic calculi to evaluate the proper management of a case with prostatic disease.

Two types of prostatic calculi are described. True or endogenous calculi occur in the gland itself, and the false or exogenous calculi occur in prostatic urethra. The endogenous variety is by far more common.

FALSE CALCULI :

The false prostatic calculus is one which gets into the prostatic urethra from the bladder and gets stuck up there and enlarges in size. It may get dumb-bell-shaped and protrude within the bladder cavity. I had one case of this type in a patient of about 35 years whose chief complaint was dribbling incontinence of urine with attacks of retention of urine off and on. It is difficult to displace the calculus by means of a metal catheter due to the difficulty in dislodging the enlarged prostatic portion of the dumb-bell out into the bladder cavity. The same difficulty occurred in removing it by cystolithotomy. The internal vesical orifice had to be dilated by fingers before the stone could be dislodged. Sometimes the internal vesical sphincter has to be nicked by knife and the opening enlarged.

The other case of false prostatic calculi was of the size of a millet seed lying in the prostatic urethra in an old man of 55 years. The chief complaint was dysuria and intermittent obstruction of the urine. Such a case could be operated upon either by the retropubic or the perineal route. The former route could be tried after removal through the bladder cavity by dilatation of the internal vesical orifice is unsuccessful.

False prostatic calculi are usually solitary and grow to a large size in contradistinction to true prostatic calculi which are more often small and multiple. The false calculi may be formed by the dislodgment of one of the true prostatic calculi into the prostatic urethra where it enlarges in size, due to its contact with urine all the time. It has been pointed out that exogenous prostatic calculi can be differentiated from endogenous by their chemical composition, the nuclei of the former being composed of urates and earthy phosphates and not of any organic material.

The false calculi can also form in the prostatic bed of an operated case of prostatectomy but such cases are rare due to the eradication of infection by the use of antibiotics.

TRUE CALCULI :

The following are the theories concerning the aetiology of true calculi :

The normal prostate contains amyloid bodies or corpora amylacea which are brownish gritty bodies composed of albuminoid substance and lecithin and laminated like starch granules. They are formed from desquamated epithelial cells and prostatic secretion. These are lying in the prostatic acini or ducts and serve as nucleus for formation of multiple stones which are formed due to the deposition of lime salts. These usually do not come in contact with urine and thus form multiple small irregular calculi.

It is believed that the corpora amylacea acting as a foreign body obstruct the prostatic ducts transforming the acini into closed cavities. The prostatic secretion gets infected which sets up inflammatory reaction in the mucous membrane of the acini as a result of which the irritated mucosa casts off inorganic salts (calcium phosphate and carbonates) which impregnate the corpora amylacea converting them into prostatic calculi. Since urinary calculi usually result from stasis associated with infection and since the same process occurs in the prostatic gland it is reasonable to infer that stasis plus infection is the cause of prostatic calculosis.

Due to the increased epithelial desquamation and stagnation in the ducts in old age its higher incidence in old age is explained. Prostatic calculosis is rare before the age of 30 years.

When small stones obstruct the ducts there is dilatation of the corresponding acini with formation of pseudo-diverticula in which bigger stones are formed. When benign prostatic hypertrophy is present the enlarging adenoma presses upon the ducts of the peripheral glandular portion of the prostate in which stones form and lie embedded in the false capsule. They may be left behind in the prostatic bed after enucleation.

The higher incidence of associated prostatitis and hypertrophy is usually met with and has been reported by many authors. It is believed that prostatitis develops secondary to calculi because of partial obstruction to the ducts with inadequate drainage of prostatic secretion and also because of secondary infection due to the presence of foreign body. The association of the above prostatic pathology should always be kept in mind in treating such cases. The association of prostatic carcinoma with calculi is said to be very rare—one case having been described out of 48 cases by

Pressman (1954). The Mayo Clinic's figures of Cristol and Emmett (1944) during the period of from 1938 to 1942 show almost equal incidence of prostatic calculi in benign hyperplasia (7 per cent) and prostatic carcinoma (6 per cent). In the majority 72 per cent the grade of malignancy is 1 or 2 but any grade may be associated. In the series reported by Pressman chronic prostatitis was present in 39 per cent, benign hypertrophy in 39 per cent in a series of 48 cases.

In my series of six cases of true calculi I had one case of calculi with adenocarcinoma of the prostate. All the other five cases had chronic prostatitis, in two of which the prostatic cavity was a sac of stones and the prostate was reduced to a very thin layer of fibrosed tissue. In one case the calculi were very small and embedded in the fibrosed prostatic gland which gave rise to complete retention of urine with a high blood urea and anaemia. Cases of hypertrophy of the prostate with calculi also show signs of chronic prostatitis. In one case who had no symptoms of prostatism, the prostate was small and fibrosed on rectal examination. I came across one case of calcification of the prostate with a big calculus felt per rectum in a patient of genito-urinary tuberculosis aged about 40 years.

The stones are composed (as reported by some workers) of organic matter consisting of protein, cholesterol and citrate and inorganic matter consisting mostly of tertiary calcium phosphate with smaller quantities of calcium oxalate, carbonate or uric acid. The nucleus of true prostatic stone is composed of organic material of an albuminoid nature and not pure protein. It may consist of corpora amylacea, blood clot, epithelial debris or clump of bacteria. The stones vary in size from grape seeds to those of millet and the largest I had in my series were faceted and of the size of about ¼" × ⅛". They may lie separately in the acini or ducts or in a cavity due to the breaking down of intervening tissue. They come in contact with one another and due to being tightly packed get faceted with polished surfaces. A feeling of crepitus is felt by the rectal examination when they lie in clusters or at the periphery of the gland. The shape of the calculi when lying separately is irregular and jagged and usually they form casts of the cavities in which they lie. The colour varies from light grey to dark brown. Though the endogenous multiple small calculi formed from corpora amylacea are not formed from urinary constituents, in many cases such calculi of big size can be regarded as urinary concretions because they lie in recesses which open freely in the urethra, e.g., congenital diverticula or acquired pouches formed as a result of abscess cavities which have burst into the urethra. Their composition then is usually that of urinary salts.

Symptoms

A majority of small prostatic calculi lie dormant and may not produce symptoms. Some cases have urinary symptoms of a mild or moderately severe type. The symptoms are usually due to the associated prostatic disease unless the stones are multiple as in two of my cases. One of my cases had multiple prostatic calculi which were asymptomatic. He was admitted for renal colic and the stones were detected on routine x-ray examination.

The symptoms may be; (1) Irritative or obstructive in nature, e.g., frequency, dysuria, slowing of the stream or dribbling of urine. The cases with multiple calculi usually come with these symptoms and the diagnosis is made by rectal examination and confirmed by x-ray. All my cases had symptoms of this type.

(2) The symptoms may be of chronic prostatitis associated with suprapubic or perineal discomfort, backache, priapism, haemospermia and painful ejaculation.

Diagnosis

Calculi are detected on routine x-ray examination of the pelvis. Urine examination reseals persistent pyuria or haematuria and there may be a history of very small calculi being passed in the urine. When a case of chronic prostatitis does not yield to conservative treatment, an x-ray should be done to exclude the presence of calculi which usually keeps the infection persisting. Rectal examination is diagnostic in 17 per cent of cases. The difficulty of diagnosis is marked when the gland is hypertrophied. Multiple stones are recognised by the feeling of crepitus, as if a number of shots are felt in a bag. Rectal examination with a metal sound in the urethra helps a great deal in diagnosis.

A definite diagnosis is made by an x-ray of the pelvis with the tube centred over the pelvis. An anteroposterior view gives a shadow in intimate relation to the pubis either behind or just above it. Young (1934) advises a firm pillow to be kept under the back with legs hanging over the sides of the table and feet resting on the stool when x-ray is taken. There is considerable tilting of the pelvis and the shadows of the prostatic calculi and pubis are separated. The grouping of the stones is such that the lobes they occupy are obvious from the skiagram. A cysto-urethrogram is valuable not only in showing the extent of prostatic enlargement and placement of stones but also in differentiating between endogenous and

exogenous calculi. Urethroscopy may reveal the presence of stones in the prostatic ducts.

The routine x-ray of the pelvis of all cases with prostatitis and benign hypertrophy is advised to get an idea of the frequency of prostatic calculi.

The skiagram of a case of radio-opaque shadow in the region of the prostate (Fig. 1, *vide* Plate) gave a suspicion of the presence of prostatic calculi in a young man of 30 years who had some urinary trouble which was a coincident symptom of meningomyelitis with slight paraplegia. There was improvement in the latter condition but slight dysuria persisted, the cause of which was thought to be due to the suspected prostatic calculi in the skiagram. On exploration of the bladder and prostate no calculus was detected. The rounded shadow in the region of symphysis pubis was either a calcified gland or phlebolith or most probably a bone island in the left pubic bone. So one should be alive to such hazards in the radiographic diagnosis of radiopaque shadows in the region of prostate which are likely to be mistaken for calculi. The x-ray shadow of true or false prostate calculi should be exactly in the centre behind the symphysis pubis. In the above skiagram the rounded radiopaque shadow was to the left of the midline and hence the mistake in diagnosis.

The skiagram taken with a rubber catheter in the prostatic urethra (Fig. 2, *vide* Plate) shows the shadow well away from it and is a useful guide for the correct position of the calculi.

Cancer of the prostate is the only disease of the prostate which has to be excluded where the rectal examination reveals a nodular hardness indicating the presence of calculi. X-ray should confirm the diagnosis unless both the diseases are associated together.

Tuberculosis of the prostate with calcification is sometimes met with, but the presence of tuberculous infection in the seminal vesicles and epididymis should clinch the diagnosis. I had one case of this type and he had tuberculous infection of the urogenital tract.

Chronic prostatitis and benign hypertrophy when present with calculi depict their own typical symptoms and the presence of calculi is a coincidence and detected provided an x-ray is taken.

In an abscess of the prostate there is asymmetrical enlargement with tenderness on pressure.

Treatment and Management

The treatment of the true prostatic calculi is that of the associated prostatic pathology—either benign hypertrophy or chronic prostatitis. The exception is a case with multiple calculi which requires surgical removal for the relief of symptoms. I had two cases of this type, in one the stones were very small and were detected when the case was being treated for suprapubic removal of the prostate and a sac full of grape-seed-like calculi were found. The patient was aged about 45 years and had symptoms of prostatism. After removal of the stones a resection of the posterior third of the bladder neck was done. The patient could pass his urine in stream and never reported again. Another case was diagnosed by rectal examination and x-ray. The grating of the stones could be felt by rectal examination and a retropubic operation was decided. All the stones were taken out and the anterior capsule of the prostate was sutured. The patient was discharged with a normal urinary stream within 10 days.

The retropubic approach is preferred for enucleation of the prostate and removal of stones. The prostatic bed can be visualised and the prostatic calculi can be removed under direct vision. Excision of portions of posterior capsule can also be done when necessary without any danger of postoperative complications. In some cases the calculi are so adherent to the posterior false capsule that its excision may be necessary to remove the calculi adequately. This is only possible by either the retropubic or perineal approach. The suprapubic transvesical route is not so satisfactory because the posterior capsule is not so accessible. In old men who have neared the end of sexual life, some prefer to treat prostatic calculosis by removal of the prostate with the capsule (total perineal prostatectomy). To completely remove all calculi as well as infected prostatic tissue in cases of chronic prostatitis it is necessary to remove the prostate with its capsule. Conservative operations of prostatotomy or transurethral resection are not helpful and will lead to persistence of the symptoms.

The perineal approach has the disadvantage of the occasional occurrence of post-operative incontinence and perineal fistula.

In patients with prostatic hypertrophy with stones, removal of the prostate is done either by suprapubic or retropubic route for the relief of symptoms of obstruction. There was one case in my series where the stones were taken out along with the removal of the enlarged gland by retropubic route. The stones were very few in number and were detected during the course of removal of the gland. One of the cases operated by suprapubic route was diagnosed histologically as adenocarcinoma with prostatic calculi. The calculi were very small and there was a gritty feel on cutting the prostate by knife.

The transurethral route is preferred for smaller glands since calculi lie between the adenoma and

the false capsule. A complete resection is done up to the capsule and the calculi when exposed are dislodged and evacuated through the resectoscopic sheath. Emmett of Mayo clinic reports that complete removal of all calculi is not necessary for good functional results. The removal of the obstructing prostate along with the removal of most of the calculi is enough for satisfactory result. I have no experience of this method.

In one case the stones were present along with chronic prostatitis and a small fibrosed gland. They were detected on routine x-ray examination. Suprapubic cystotomy was done for retention of urine. The condition of the patient did not allow an operation of enucleation as he had a high blood urea and severe degree of anaemia.

Some patients with prostatic calculi may have transient attacks of pyuria or pus in prostatic secretion which can be treated by prostatic massage and broad spectrum antibiotics. The recurrence of prostatitis can be managed by conservative measures. Pressman reports 35 per cent of cases who received no therapy of any kind and 43 per cent who were treated by massage and medicines only, thus a total of 78 per cent required no operative treatment.

The danger of long-standing low grade infection in the prostate secondary to prostatic calculi is of little practical importance and the patient may not develop any complications. Consequently subjecting the asymptomatic patients to major operative procedure is not considered advisable and may be associated with dangers and complications.

In the cases of false calculi the stones should be removed by suprapubic cystolithotomy and if not successful should be tackled by the retropubic approach. An effort should be made to push the exogenous calculi into the bladder by a metal sound if possible, removal from the bladder being easy.

Summary

1. The literature and aetiology of true and false prostatic calculi are described.

2. The symptomatology and treatment is discussed along with a review of the cases treated by the author at the Sarojini Naidu Hospital, Agra. The majority of cases have been found to occur with an associated pathology in the prostate. One case of calcification of prostate in a patient of genito-urinary tuberculosis has been met with.

3. A routine x-ray of all cases with prostatism is advised to diagnose cases of prostatic calculi and get an idea of its frequency in Indians.

4. The treatment of multiple calculi by the retropubic route is preferred. The treatment of false calculi is also discussed.

Acknowledgment

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CASE NOTES

AGRANULOCYTOSIS FOLLOWING ANTIMONY THERAPY IN KALA-AZAR

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Introduction

Cases of agranulocytosis occurring as a complication of kala-azar were first observed by Zia and Forkner (1934). Subsequently many cases of severe agranulocytosis in kala-azar were noted by Huang (1940). He reported 42 cases of acute agranulocytosis out of 554 proved cases of kala-azar thus bringing the incidence to about 7·6 per cent.

Davis and Wingfield (1941) reported a case of agranulocytosis in kala-azar treated with 2·6 g. of pentavalent organic antimony compound in 12 days in an Indian seaman in London. Tobias (1942) reported two fatal cases of severe agranulocytosis following kala-azar from Western Abyssinia.

In India the incidence of agranulocytic angina as a complication of kala-azar, is extremely rare. Napier who was both in China and in India, found many such cases in China, but did not encounter a single case in India. In India the first case of severe agranulocytosis in kala-azar was reported by Das Gupta and Sen Gupta (1943). Sen Gupta and Chakravarty (1945) found another case of agranulocytosis in their analysis of 50 cases of kala-azar, followed by report of 4 such cases complicating kala-azar two years later. A case of severe agranulocytosis following kala-azar was also reported by Banerjea (1950).

Although some cases of agranulocytosis in kala-azar were noted at the end of antimony treatment by Zia and Forkner (1934), they have not definitely stated whether antimony itself has any causal role in its production.

Their experiments on rabbits with large doses of antimony did not show anything comparable with agranulocytosis. The main changes in these animals were hyperplasia of spleen, lymph nodes and bone marrow. Erman (1939) found increase in leucocytes with organic antimony compounds.

Vecchio (1939) and Huang (1940) reported agranulocytosis as a result of treatment with tartar emetic and antimony respectively.

A transient fall of W.B.C. and granulocytes after the institution of antimony therapy in kala-azar, was observed by many workers subsequently. But the role of antimony in the causation of agranulocytosis was not stressed in these cases. The temporary deterioration of the blood condition, however, improved spontaneously in spite of the continuation of treatment with antimony compounds.

A case of kala-azar where organic antimony compounds were administered followed by a depressant effect on the W.B.C. count is reported. As far as we know, no such case has yet been reported in India.

Case Report

B.G., 21 years, male, a resident of Kidderpore, Calcutta, was admitted into the hospital on 8-5-1954 with a history of high fever of sudden onset 12 days ago. Since then the fever used to come with chill and rigor and subsided daily with sweating. 5 days later fever became continuous. There was no other accompanying symptoms with the fever.

He had a past history of malarial fever in childhood. On examination his general condition was fair, with moderate anaemia, pulse rate was 120 per min. and lungs normal. The spleen was palpable 1½ fingers, firm and the liver was 1 finger enlarged and firm.

W.B.C.—3,000 per c.mm. with polymorphs 56 per cent, lymphocytes 42 per cent and monocytes 2 per cent. R.B.C. 2·7 million per c.mm., Hb. 7·8 g. per cent. No malaria parasites found.

Blood for Widal test was negative, C.F. test for kala-azar was strongly positive. Sternal puncture smear revealed L.D. bodies in fair number.

Another blood examination was made on 22-5-54. The findings were as follows: W.B.C.—2,500 per c.mm. with polymorphs 52 per cent, lymphocytes 46 per cent and monocytes 2 per cent.

Urea stibamine 0·05 g. I.V., was started on 23-5-54 and gradually a dose of 0·2 g. (I.V.) was reached on 29-5-54. On 31-5-54 the patient had a sudden rise of temperature (103°F). He looked very ill and was very toxic. The pulse rate was 148 for minute and the respiration 30 per minute. There was pain in the throat and the mucous membrane of the mouth and the throat was congested. There was a slight swelling of the local area of injection. Spleen and liver same as before.

Injectio penicillin (2,00,000 units B.D.) was started and continued for 12 days more. Urea stibamine was stopped.

2-6-54.—The condition of the patient deteriorated, temperature was 104°F. The pulse was 158 per minute and respiration 40 per minute. Superficial and upper deep cervical glands on both sides were swollen and tender. The patient had difficulty in swallowing. No cause for this was found out till the blood count was done 6 days later.

On 5-6-54, when W.B.C. was 1,050 per c.mm. with 6 per cent polymorphs a blood transfusion was given. Two days after the transfusion the temperature became normal and the general condition became remarkably well. Another blood transfusion was given three days after the first transfusion. The W.B.C. count became normal. Intramuscular injections of sodium antimony gluconate were started in place of urea stibamine. After injecting 13 c.c. in 7 days in 4 injections, a W.B.C. count was done. A rapid fall of total W.B.C. count with the fall of granulocytes was noted, and so the injections were stopped. We were afraid of continuing the injections upto a stage of severe agranulocytosis. The blood condition improved spontaneously after the withdrawal of injections. To see whether this effect on the W.B.C. count was due to antimony compounds, another two injections of sodium antimony gluconate of 4 c.c. each were given. The W.B.C. count again had a rapid fall, both in total and in granulocyte counts. Within a few days of withdrawal of antimony therapy, the blood count improved considerably. He was then treated with pentamidine isothionate. After giving three injections of pentamidine of 100 mg. each, another W.B.C. count was done. This time the W.B.C. count, instead of a fall as in the previous occasions showed a slight rise both in total and granulocyte counts (Fig. 1). As the patient did

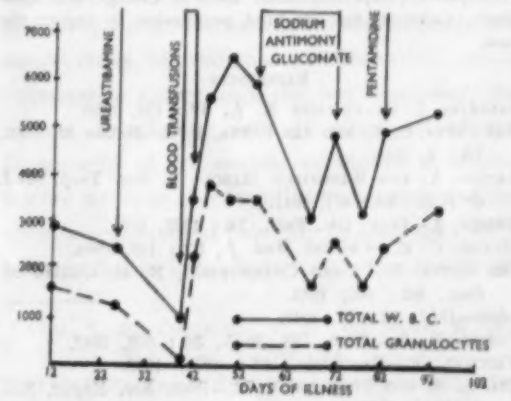

Fig. 1—Effect of Antimony Therapy on Total W.B.C. and Granulocytes in Blood in a Case of Kala-azar.

not want to stay any longer in the hospital, he was discharged.

On the day of discharge he showed a gain in weight by 10 lb. since admission. His appetite was normal. W.B.C. and R.B.C. counts and haemoglobin were nearly normal, spleen was 1 finger, soft and liver was just palpable and soft. Details of the clinical findings and progress of the case is graphically presented in Fig. 1.

Comments

It will be seen in the above case that organic antimony compounds produced a condition of severe agranulocytosis after a few injections. The behaviour of the blood picture cannot be the initial transient negative phase, as described by Federico (1939) during which the blood condition deteriorates in the course of antimony therapy in kala-azar. Nor was it due to the administration of any particular antimony compound. The repeated fall of the total W.B.C. and granulocyte counts immediately after the administration of different antimony compounds, the return of the same to the previous level after the withdrawal of the injections, and the improvement of the W.B.C. count after the injections of pentamidine isothionate subsequently, go to show that the antimony compounds, exerted a depressant effect on the white cells of the blood in this case.

It is also to be noted that the C. F. test for kala-azar was found to be positive as early as the 16th day of illness.

Summary

A brief review of literature on agranulocytosis in kala-azar is made.

A case of agranulocytosis following treatment with antimony compounds in a case of kala-azar in a young Bengalee, has been described.

Acknowledgment

Our grateful thanks are due to Prof. J. C. Banerjea, for his valuable suggestions and to Dr. M. N. Sarkar, Principal-cum-Superintendent, Medical College and Hospitals, Calcutta, for his kind permission to report the case.

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ENCEPHALOPATHY FOLLOWING USE OF DIETHYLAMINE ACETARSOL

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Bulsar

Diethylamine acetarsol, as distinct from other arsenical compounds, seems to be peculiarly prone to be followed by the grave complication of encephalopathy with greater frequency than other arsenical preparations in common use. Encephalopathy is encountered usually after the third injection of diethylamine acetarsol—ushered in by intense headache, unconsciousness and convulsions. In a population of 25,000, four cases of encephalopathy after injection of the drug were recorded during the year. Das Gupta and Prasad (1954) cited three cases in the article on "Treatment of Arsenic and Gold Encephalopathy with BAL." Two of their patients developed encephalopathy after the third and one after the second injection of the drug, with two recoveries and one death.

It appears that diethylamine acetarsol has special predilection for brain tissue. It is quite likely that many cases of diethylamine acetarsol encephalopathy are missed or not brought to light. A resume of some case histories are given below :

Case Reports

Case 1.—G. U., aged 40, well-built and well-nourished, cough off and on, and with rhonchi on prolonged expiration. Urine showed no albumin or sugar. On 1st, 6th and 10th of September, 1953 diethylamine acetarsol was given. The patient got convulsions and became unconscious on 11-9-1953 recovering after three days' treatment with BAL.

Case 2—K. U., aged 22, labourer, healthy and of lean build. Cough of 2 months' duration and eosinophilia 42 per cent. Urine showed no albumin or sugar. Diethylamine acetarsol was injected on 2nd, 6th and 10th of February 1954. On the 11th he became deeply comatose, got convulsions and died after two days though treated with BAL etcetera.

Case 3—A. M., aged 26, well built and well nourished was suffering from filariasis. Urine showed no albumin or sugar. He had injections of diethylamine acetarsol on 2nd, 6th and 12th May, 1954. He became unconscious on 12th May in the night, got convulsions and died after three days inspite of treatment with BAL etcetera.

Case 4—B., aged 6, complained of cough and dyspnoea. Urine showed no albumin or sugar. Injection of diethylamine acetarsol (child dose) 2 c.c. on 18th, 22nd and 26th May, 1954. In the early hours of 27th the child got convulsions, became unconscious and died the same evening though she was treated with BAL etcetera.

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VAGINAL CYTOLOGY IN BENIGN CERVICAL LESIONS

In recent years considerable attention has been drawn to cytological diagnosis of carcinoma of the female genital tract. Thanks to the classical work of Papanicolaou and that of numerous subsequent workers the cell variations in malignant neoplasia of the cervix uteri are fairly well known. It is unfortunate however that an equal amount of attention has not been given to the cytological features of other benign lesions of the cervix with which malignancy may well be confused. From this point of view alone, if not for the academic interest which it provides, the present communication by Wahi[1] is welcome.

Of all carcinogenic conditions of the cervix, chronic inflammation is recognised as most important. Murphy and Herbut[2] observe that chronic inflammation of the cervix is, if not carcinogenic *per se*, at least a prominent agent in the complex genesis of cancer. Ayre[3, 4] has described four stages in cellular pathology from normal, through the stages of inflammatory hyperplasia and 'nearo-carcinoma' to the malignancy. Whether a cytologist is in complete agreement with this evolutional hypothesis may be a matter of opinion. The fact remains, however, that the role of inflammatory cytological reactions as a precursor of cancer cannot be summarily dismissed. This alone, if nothing else, should stimulate the cytologists to a greater understanding of the cellular responses in inflammatory cervical lesions. Indeed, a more intimate knowledge of this subject will undoubtedly reduce the incidence of false cytological diagnosis in early cervical cancer.

A cytologist studies the exfoliated cells. These cells may be desquamated singly or in clusters. Whichever it is, a correct diagnosis depends on an exact understanding of the individual epithelial cellular reactions to inflammatory agents, be they bacterial or protozoal in nature. During the acute phase of the inflammatory process the cells in the vaginal discharge show nuclear and cytoplasmic changes apart from the preponderance of leucocytes, hystiocytes and bacteria. Depending upon the intensity of cytolytic effect of the bacterial toxins and inflammatory exudate, various degrees of manifestations of cellular disintegration may be revealed in the smear. The epithelium may lose its staining property, the cytoplasm may show disintegration, the nuclei may reveal varying degrees of karyolysis and chromatolysis and quite a number of naked nuclei may be found lying scattered in the field. In those cells where the cytoplasm is intact, a tendency to a diffuse and indistinct acidophilia is very often characteristic[5]. This gives a false impression of cornification. Apart from the uneven acidophilic cytoplasmic stain, absence of maturation of the nucleus easily differentiates this from true cornification.

Infective reactions often cause enlargement of the nucleus and the cell, at all levels of the epithelium. Inadequate understanding of this feature may lead to a diagnosis of macronucleosis and macrocytosis of malignancy. However, careful examination shows, as Wahi[1] has mentioned, that nuclear cytoplasmic ratio is often not altered. Irregularity of the nuclear membrane is another feature which is also found in malignancy and frequently a perinuclear halo may be observed. Ayre[6] believes that in inflammatory cells this halo is less

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[4] AYRE, W. B. AND AYRE, J. E.—*Ibid.*, **54** : 970, 1947.

[5] AYRE, J. E., CHEVALIER, P. M. AND AYRE, W. B.—*J. Clin. Endocrinol*, **7** : 749, 1947.

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defined than that in a precancerous cell. The cytological appearances of infection are so variable in different smears that all possible changes are to be kept in mind in proclaiming a diagnosis. These have been beautifully illustrated in the excellent monograh by Ayre[6], which every cytologist will do well to consult. Preponderance of cornification of the less mature cells, unevenness of nuclear forms with occasional reduplication of the nuclei, evidences of chromatin fragmentation, some degree of hyperchromatism, anisocytosis, anisonucleosis, foaminess, and vacuolation of the cytoplasm, especially of the cells of the deeper zone, large clusters of basal and parabasal cells, are all evidences of infection, but all need not be present in the same smear. Occasionally, the presence of 'tadpole' cells like that demonstrated by Wahi may lead to a diagnosis of malignancy unless the nuclear features are carefully studied. Vermiform bodies in atrophic smears sometimes cause confusion. Preponderance of histiocytes with their bizarre pattern is another disturbing element. The difficulty created by *Trichomonas vaginalis* always encounters the beginner, but an experienced cytologist will have well aquainted himself with the typical 'mongol-eye' appearance of these cells in a stained specimen.

In presence of erosion sometimes the capillary processes are torn away, especially during the stage of active growth of the columnar epithelium. Generally these cells are easily discernible from the presence of columnar cells at the edges and a dense scattering of inflammatory cells. But if a spatula or an Ayre's spoon has been used for making the smear, the cells may be distorted, and the presence of inflammatory nuclear reactions may create difficulties in reporting on such a smear. This has been ably pointed out by Osborn.[7]

One of the points which has provided an interesting study to a gynaecological pathologist is epidermidisation. In a recent issue of this journal this subject has been discussed by Reddi *et al*[8] from the point of view of a pathologist. To a cytologist this creates another stumbling block. Sometimes they give rise to an appearance similar to oestrogen deficiency. At other times confusing signs of cellular hyperactivity are present.

A cytologist who follows Ayre's[6] gradation of cytological changes will find his task heavier when he tries to differentiate between infective and 'ncaro-carcinomatous' changes. But a differentiation between typical infective and malignant changes should not be difficult to an expert worker. However, the confusion created by atypical infective changes will continue to persist until further observations are made in which the clinician, cytologist and pathologist work in a team and systematically follow up their cases for a number of years. In view of the greater reliance which is being placed on cytological diagnosis of malignancy this is worthy of consideration by all who are interested in an early diagnosis of cervical cancer.

HEALTH SCHEME UNDER THE SECOND FIVE YEAR PLAN— I.M.A.'S RECOMMENDATIONS

Outlines of a health scheme have been recommended for the Second Five Year Plan by the Indian Medical Association. The recommendations have been published elsewhere in this issue.

In the First Five Year Plan, the medical and health programmes were not formulated on clear-cut bases. The provisions were as meagre as their execution was sketchy. They were not outlined with sufficient care and the objective was not definitely specified. The government in framing the scheme thought it superfluous to seek the counsel of the medical profession of the country particularly of the Indian Medical Association

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which is the only national representative medical organisation.

The Association however, in the words of its president, Dr. S. C. Sen, "though not much impressed by its medical and health provision was willing to give some support". But our democratic government was not keen on having a scrutiny and study of the plan by the Association. In any health scheme for a vast country like India full of complicated problems on all sides, the government did not realise that an expensive health scheme like that embodied in the First Five Year Plan should have been thoroughly examined by the most representative medical opinion available here.

The health scheme of the I.M.A. under review, consists of two parts. The first part contains a thorough review of the present health status of the country which has been achieved during the First Five Year Plan. An examination of the present health conditions in the different States of India, shows some progress in the control of malaria and in the improvement of health services, but the results in other directions are not very encouraging. Infant mortality has come down from 122·8 per 1000 live births in 1949 to 115·9 only in 1954. Maternity and child welfare do not benefit more than 5 to 10 per cent of the mother and child population. Nearly 200,000 mothers lose their lives during childbirth every year. Deaths from preventable diseases still constitute a major portion of total deaths even in comparatively developed States. The water supply position does not show much improvement. Expansion of hospitals does not show appreciable progress, and shortage of medical personnel still remains the crying need of India except perhaps in the State of West Bengal. Preventive medicine which should have been more extensively applied, does not appear to receive adequate attention.

The second part of this document sets forth the proposed scheme. As essential objectives, the following have been suggested, (1) prevention of illness, (2) rendering scientific medical relief irrespective of individual financial resources, (3) undertaking measures for achieving positive health and (4) spread of medical education and medical research.

Prevention of illness and achievement of positive health should be in the foreground of all health activities. The entire system of public health should be built on the principle of prevention. Preventive measures are less expensive and more health promoting than the curative form of combating diseases.

Malnutrition has become the major health problem of the present time. It is an accepted fact that illness flourishes on malnutrition. So special attention has been drawn in this recommendation to the question of nutrition. Free milk to expectant mothers and infants, free tiffins to school children and free examination of their health from time to time and production of protective food and pure water supply, constitute some of the valuable measures in preventing diseases and these have been recommended in this health scheme.

In the Second Five Year Plan, the emphasis has been shifted from agriculture to basic industry, heavy chemicals and mining. Industrialisation to a large extent would provide employment and naturally a better nutrition. Along with the expected increase in individual income amongst the masses, if a clear cut programme of preventive medicine is followed we can expect that health will become not merely an absence of disease but something positive, a joyful attitude towards life.

Further analysis of other details of this scheme will show that it contains recommendations in all aspects of health, preventive and curative, with financial implications also. We wait to note the attitude of our government towards this health scheme recommended by the I.M.A.

CURRENT MEDICAL LITERATURE

Use of Air in Ophthalmology

STALLARD (*Brit. M. J.*, **1**: 1273, 1955) at the Annual Congress of Ophthalmological Society of the United Kingdom, London, said that the intraocular injection of air had been used in ophthalmology therapeutically for the treatment of tuberculous iritis, diagnostically as an aid to the location of intraocular foreign bodies and intraorbital neoplasms, but chiefly to help in the anatomical replacement following operations. After cataract extraction air was injected into the anterior chamber to re-form this and to keep the iris and viterous face away from the wound; following cyclodialysis for glaucoma, air checked bleeding, reformed the anterior chamber, and kept the fistulous tract open; after the operation for retinal detachment air in the vitreous restored the normal anatomical position of the retina; it was of value in the operation of keratoplasty to keep the bed of the transplant away from the iris and lens; and in the division of anterior synechiae air could be used to put the synechiae on the stretch and facilitate intraocular instrumentation. Air was compressible, continued Mr. Stallard; it produced a spring-like pressure, its site in the eye could be controlled by posture, and it was absorbed over a period of four to eight days. These were the properties which made it so useful in ophthalmology. The dangers attending its use, air embolism and the production of glaucoma, were almost negligible. Sterilization of the air was achieved by autoclaving a syringe with the plunger withdrawn.

Radioactive Isotopes in the Diagnosis of Intraocular Tumours

PLAIN AND TUDWAY (*Brit. M. J.*, **1**: 1273, 1955) at the Annual Congress of the Ophthalmological Society of the United Kingdom, London, read a paper on the use of radioactive isotopes in the diagnosis of intraocular tumours. The technique had practical importance because it was often difficult to distinguish clinically between malignant and non-malignant neoplasms in the eye. However, the excess take-up of such isotopes by most actively growing tumour tissue had now been amply verified. The authors used radioactive phosphorus (P^{32}) which with its short-range beta emissions appeared to give significant findings on the Geiger-counter. Adult patients were given 1 millicurie of radioactive phosphorus in water, sucked through a straw, and 24 hours later Geiger-counter readings were taken by a medical assistant or technician who had no knowledge of the site of the tumour. These readings were taken in the various meridians of the affected eye, and controls were taken from the symmetrical meridians in the fellow eye. The statistical error of the method was plus or minus 15 per cent. In general (save in very small or very posterior tumours) the significant difference between the two eyes was taken as 40 per cent or over. The cases of malignant tumour which the authors had studied showed a significant differential reading, and there was only one case, which had a low total, and therefore unsatisfactory, count, where the results of the method were misleading. In the discussion it was pointed out that the results did not depend on pigmentation of the tumour but rather on hyperactive cell metabolism; that most of Mr. Palin's cases were clinically suspect before the test was used; that, in the acute stage, uveitis might produce a misleading result; and that the method as at present developed was not of value in gliomata in young children.

Causes of Foetal Mortality and Foetal Hypertrophy in Diabetic and Prediabetic Women

MOREAU and others (*Semaine hop. Paris*, **31**: 656, 1955, Ref. *J.A.M.A.*, **158**: 231, 1955) write:

Many attempts have been made to explain the high foetal mortality found in women with diabetes or in the prediabetic state. Manifestations of the maternal disease, e.g., acidosis, hypoglycaemia, and vascular disturbances, were first considered responsible; later, conditions affecting the foetus, such as hypoglycaemia, macrosomia, and pulmonary atelectasis, were blamed; and, finally, attention has of late been turned to the possible effect of toxaemia of pregnancy and hormonal imbalance. Maternal hypoglycaemia is now generally considered to be without effect on the foetus; maternal acidosis and vascular disturbances, however, are undoubtedly responsible for a certain number of foetal deaths *in utero*, and their harmful effects may even be felt by the living infant for a few days after birth. Prediabetic foetal mortality, on the other hand, cannot be ascribed to any of these causes. Foetal hypoglycaemia is apparently no more important than maternal hypoglycaemia as a cause of death. Congenital anomalies, however, and neonatal atelectasis often lead to death, and further study is needed to determine why they occur with greater frequency in the children of diabetic than of nondiabetic mothers. Toxaemia of pregnancy is not, in itself, a sufficient explanation of foetal mortality; it may in fact exist without causing death, and, on the other hand, the foetus may die *in utero* without any of the clinical signs of toxaemia being present. Clinical toxaemia of pregnancy, however, is accompanied and preceded by hormonal imbalance characterized by an increase in chorionic gonadotrophin and a reduction of the steroid hormones. Opinions differ in regard to the value of hormone therapy and the methods by which it should be applied, but the results obtained by the authors in 22 patients treated with hormones were substantially better than those obtained in 54 patients treated only by diet and insulin therapy. The causes of foetal hypertrophy do not seem to be exactly the same as those of foetal mortality. Foetal hyperglycaemia and hormonal imbalance cannot be responsible for the hypertrophy, because neither strict control of maternal hyperglycaemia nor hormone treatment has prevented women with diabetes from having large infants. Experiments suggesting the possible participation of the adrenal cortex in the production of hyperglycaemia show, however, that the administration of cortisone in moderate doses to pregnant rabbits will be followed by an increase in foetal weight. Another, and apparently the best, theory is that the foetal hypertrophy is due to hypersecretion of the hypo-

physeal somatotropin. This theory also provides a logical explanation of the physiopathology of diabetic and prediabetic pregnancy as a whole, because it recognizes the bivalent effect of somatotropin. Thus the hypersecretion of somatotropin would be responsible for foetal macrosomia and hypertrophy of the islands of Langerhans in pregnant diabetic women and for foetal macrosomia in prediabetic mothers, and its persistence after elimination of the foetus might lead to the subsequent appearance of diabetes. Proof of the validity of this theory, which supplements rather than contradicts the theory of hormonal imbalance must await the development of an accurate method of assaying somatotropin.

Acquired Fibrinopenia in Pregnancy

BARRY AND OTHERS (*Brit. M. J.*, **2**: 287, 1955) write:

Two methods of confirming the clinical diagnosis of acquired fibrinopenia in pregnancy are described. Patients who show a Schneider titre of 1 in 100 or less (plasma fibrinogen probably below 120 mg.) should be regarded as potential victims of a haemorrhagic diathesis. If haemorrhage occurs it cannot be checked without restoring the blood fibrinogen. Even if there is no manifest haemorrhage, disastrous bleeding may be provoked by active intervention. Since stored blood for transfusion will have a fibrinogen content of 200 mg. per 100 ml. or less, it may not be possible to raise the blood fibrinogen to a safe level by transfusion of whole blood. If pure fibrinogen is not available a rapid restoration of clotting power may be achieved by the intravenous injection of triple or quadruple-strength plasma [1 pint (570 ml.) of quadruple-strength plasma yields about 4·4 g. of fibrinogen].

Coagulation Failure in Obstetrics

SCOTT (*Brit. M. J.*, **2**: 290, 1955) writes:

Plasma should be preferred to dextran as an emergency blood-volume restorer in conditions in which hypofibrinogenaemia is apt to develop. The most important of these is accidental antepartum haemorrhage, others being retention of a dead foetus *in utero*, and hydatidiform mole.

The transfusion of dextran or similar preparation in any circumstance should be limited to 1 to 2 pints (0·5 to 1 litre).

Hypofibrinogenaemia can be recognized quickly by a simple thrombin coagulation test before there is clinical evidence of its presence.

In cases of coagulation failure due to fibrinogen deficiency, transfusion of double-strength plasma offers a readily available method of treatment.

Tuberculin-Testing of School Population

MURRAY AND PETRIC (*Brit. M. J.*, **1**: 1178, 1955) write that in Musselburgh 3, 282 children between the ages of 5 and 15 years were tested for sensitivity to tuberculin. This figure represented 93·5 per cent of the total school population. Consent had been obtained for the testing of 98·2 per cent of all the children.

Of the youngest group 20·3 per cent were positive, and of the 15 years group 50 per cent were positive.

Six cases of active pulmonary tuberculosis were found in the school children and five cases among the home contacts of the children with positive reactions. Thus examination of contacts of these children with positive reactions did not seem to be a very good case-finding measure.

Activity of Piperazine against *A. Lumbricoides*

STANDAN (*Brit. M. J.*, **2**: 20, 1955) writes:

Piperazine citrate, adipate, and phosphate were tested *in vitro* against *A. lumbricoides* from the pig. All three salts of piperazine were equally efficient in inducing a state of narcosis in the worms.

The drug effect was gradual and did not irritate the worms.

The drugs did not kill the worms. When placed in drug-free medium all affected worms recovered in half to two hours.

In view of the similarities observed between the drug effects of piperazine against *A. lumbricoides* from the pig, *in vitro*, and clinical use of piperazine citrate against ascariasis in man, the relationship between the beginning of drug action, duration of narcosis, rate of drug excretion, and the intestinal emptying time of the host is discussed.

Diuretic in Therapy of Epilepsy

BERCEL (*California Med.*, **82**: 107, 1955, Reg. *J.A.M.A.*, **158**: 230, 1955) writes that a certain percentage of epileptic persons cannot be entirely freed of seizures. These are at present being treated on the basis of an unsatisfactory compromise between efficient therapy and toxic condition. The blood-brain barrier is one filter point that exercises control over the drug absorption in the brain. It is assumed that any mechanism that could increase the permeability of the blood-brain barrier is likely to increase the drug's absorption by and passage into the brain. The author cites animal experiments that indicated a nearly twofold increase in anticonvulsant protection with the use of diuretics that increase blood-brain barrier permeability. Ten epileptic patients in whom adequate anticonvulsant medication had toxic effects were selected for trial. The medication they were receiving at the onset of this trial represented the optimum regimen achieved after long experimentation with a combination of drugs. The monthly number of seizures was determined for a six month period before the addition of the diuretic to the anticonvulsant medication they were receiving. This was then compared with the monthly seizure averages of another six month period following the addition of diuretics to the drugs usually taken. A case history is presented that illustrates the successful use of a diuretic. The addition of diuretics to anticonvulsant medication permitted a decrease of previously toxic dosages, without lessening, and in some cases improving, the control of seizures. In three cases excessive diuresis and gastric distress necessitated discontinuance or decrease in dosage of the diuretic.

CURRENT TOPIC

EIGHTH WORLD HEALTH ASSEMBLY

The Eighth World Health Assembly was held at University City, Mexico, from 10 to 27 May 1955. It was attended by 76 Member States and Associate Members, representatives of the United Nations and its specialized agencies, and observers for 25 inter-governmental and non-governmental organizations concerned with public health.

Dr. Ignacio Morones Prieto, Minister of Health and Welfare of Mexico, was elected President of the Assembly. In his inaugural address, delivered at a solemn ceremony at the Palacio de Bellas Artes, Mexico City, in the presence of H. E. the President of the Republic, Dr. Morones Prieto emphasized the international significance of WHO'S work:

> The enthusiastic welcome which the world has accorded the principles set forth in the Constitution of the World Health Organization is evidence of the universality of its aims and of the urgent need that was felt for the creation of an organization which would undertake on so vast a scale the advance of medical knowledge and the improvement of health throughout the world.
>
> Such an effort leads to better understanding among peoples, increases the possibilities of strengthening the bonds of friendship which political differences endanger, and, above all, affirms the principle that public health knows no frontiers—the principle which is at the very foundation of our Organization and which enables it to offer to all countries the aid which the solution of their health problems requires. . . .

Dr. S. Al-Wahbi (Iraq), Dr. J. Gratzer (Austria), and Sir Arcot Mudaliar (India) were elected Vice-Presidents of the Assembly. Professor G. A. Canaperia (Italy) was elected Chairman of the Committee on Programme and Budget, and Dr. P. E. Moore (Canada), of the Committee on Administration, Finance, and Legal Matters. Dr. H. van Zile Hyde, Chairman of the Executive Board, and Dr. H. B. Turbott represented the Board.

The Assembly devoted most of its 18-day session to a study of the Organization's activities in 1954 and to consideration of the proposed programme and budget for 1956.

Review of Activities of 1954

In presenting his report on the work of WHO in 1954, the Director-General concentrated particularly on a number of factors which are apt to play a major role in the future development of the Organization. He called attention, for example, to the need for a change in strategy in the Organization's malaria-control programme:

> The future efforts to bring safety to the more than 370 million people still exposed to malaria must take into consideration the fact, now apparently established, that anopheline mosquitos which transmit malaria may become resistant to insecticides . . . . the only road open before us is to abandon our old line of action aiming at malaria control and to concentrate on the total eradication of the disease . . . . The great challenge before WHO is, how to persuade national administrations to organize eradication campaigns and to provide them with all the types of assistance necessary to defeat, during the next decade, a disease which continues to be an actual or potential menace to one quarter of the world's population.

He also emphasized the importance to the Organization of peaceful uses of atomic energy and the possible implications which this new field may have for the work of WHO. He warned, however, that, in undertaking new types of activity such as those which developments in the application of atomic energy may bring, WHO must be careful not to upset the "delicate balance" of programmes already in operation.

Dr. Candau expressed the hope that the Organization's extremely limited financial resources might be augmented to make possible assuming more tasks as well as continuing its present work.

In discussing the Director-General's report, delegates from various countries commented on the accomplishments of WHO, made suggestions for future programmes, and gave brief sketches of health activities within their own borders.

Satisfaction was expressed with regard to the increasing stress which the Organization is placing on long-term programmes which may be integrated into the public health services of the countries assisted. It was pointed out by the delegate of Italy, for example, that, although this type of work might be less spectacular than that which characterized the Organization's early days, it was the only means of making a truly constructive and lasting contribution to the solution of the health problems of the world. And the delegate from Morocco (French Zone) expressed the opinion that this was, in fact, the way to assure the continuity of the Organization's work. The role of WHO, he stated, was not so much that of a supplier of personnel and equipment for countries handicapped by disease, poverty, or ignorance as that of a "catalyst" of all the agents used in combating poverty and illness.

In discussing the Organization's activities relative to communicable diseases, the delegates were especially concerned with malaria. They expressed general agreement with the policy of concentrating on malara eradication as a means of meeting the situation caused by the development of anopheline resistance to insecticides. With regard to tuberculosis, it was suggested that the Organization should pay particular heed to the new drugs which were being used in therapy, and to studying the possibilities of domiciliary care for tuberculosis patients, especially in the less-developed countries where hospitalization was usually out of the question.

The delegate of Morocco (French Zone) reported on the pilot project against trachoma which his Government had been carrying out with WHO and UNICEF collaboration. This project, in operation for four years, was based on the administration of antibiotics at regular intervals to control the conjunctivitis associated with trachoma. With a view to developing an integrated national programme, a system of self-treatment had been instituted during the third year of the campaign. Medicaments in the form of ointments had been distributed free of charge; and, after training in the purpose and the simple method of application of the salves, mothers were able to treat themselves and their families. Encouraging results had been achieved, even among the less-advanced population-groups; and the people were beginning spontaneously to purchase aureomycin oint-

ment, which had been placed on sale in tobacco shops in the southern part of the country. Despite a minor recrudescence of the disease towards the end of the summer season, the results achieved during the four year campaign indicated that the methods used could be successfully applied in many parts of the world.

The Regional Director for the Eastern Mediterranean and the delegate of Iran mentioned that the BCG team in Iran had been instructed to carry out simultaneously BCG and smallpox vaccinations, and that if this practice was successful it would be extended to other countries. The Assembly again urged health administrations to conduct, wherever necessary, campaigns against smallpox as an integral part of their public health programmes.

It was proposed by several delegates that the Organization should begin to take a more active interest in cancer, cardiovascular diseases, and other degenerative diseases which took such a great toll in certain countries.

The importance of environmental sanitation as a fundamental in health improvement was stressed, and considerable achievement was noted. The delegate of Syria called attention to health education as a necessary concomitant of improvements in environmental sanitation, stating that perhaps more than half of the world's inhabitants still had no real understanding of contamination and no conception of the fact that contagion existed. The public health service that was preoccupied with the engineering and regulatory aspects of sanitation, he said, was largely protecting people from themselves, whereas it could be helping people to help themselves through proper emphasis on teaching principles of hygiene.

Another basic problem—nutrition—was discussed by delegates from several countries.

The delegate of Indonesia said that malnutrition affected 40 per cent of the children of pre-school age in Djakarta. The solution, he believed, lay in providing animal protein, particularly milk; and an attempt was being made to accomplish this by importing Holstein cows from the Netherland and cross-breeding them with Indonesian cows to produce a stronger milk-yielding breed. In rural areas people were being encouraged to use milk from goats, sheep, and even the buffalo. Efforts were also being made to educate mothers in the proper feeding of infants and children.

The delegate of India called attention to the role of bad dietary habits in malnutrition and to the consequent need for health education in this regard.

The delegate of Nicaragua paid tribute to WHO and UNICEF for aid in a combined maternal and child health and nutrition programme in his country; in 1954 UNICEF had provided the Government with a milk-drying plant, so that the country was now able to provide all the milk necessary for this programme.

The delegate of Mexico stated that dietary surveys had been carried out in his country and that it had been found that malnutrition existed in most areas, with both economic and cultural causes being responsible. He said that animal protein was not available to 80 per cent of the population because of its cost, and that means should be found to add protein-rich foods such as dried fish, peas, beans and powdered milk to the diet. Health education was another means by which his Government was striving to improve nutrition.

The delegate of France emphasized the importance of health education and of developing the production of local foods as means of solving the problem of malnutrition. He suggested that WHO could usefully advise governments on the nutritional value of certain foodstuffs and on the determination of the population groups whose diet should be supplemented, and could train staff to evaluate the effects of certain foods on the physical and moral well-being of the people concerned.

A number of delegates expressed regret that the Organization's mental health programme was not more extensive. The delegate of Ireland, for example, said that the increasing strain of modern life made mental upsets commoner and psychiatry ever more necessary, and that psychosomatic illness caused such a loss of working days that any time and money spent on the improvement of mental health would be economically justifiable. He remarked that within the past three years everyone had become "converted" to environmental sanitation, probably as a result of the Assembly technical discussions and increased effort on the part of the Organization; and he stated that what was needed now was a similar conversion to an appreciation of the need for extended public-health services in mental health.

Programme and Budget for 1956

The Assembly approved the proposed programme and budget for 1956. A budget of US $10,203,084 will finance more than three hundred major health programmes. This amount includes $309,484 for the provision of supplies and equipment to the health services of countries participating in malaria-eradication campaign and $42,000 to launch the Organization's activities relating to the uses of atomic energy in medicine and public health and to the protection of populations against the effects of atomic radiation.

These two subjects—malaria eradication and WHO's responsibilities relating to developments in the application of atomic energy—were discussed at some length by the Committee on Programme and Budget.

There were delegates who felt that the objective of eradication of malaria was somewhat utopian, especially with regard to the infected areas in Africa. Doubts were also expressed as to the Organization's financial ability to contribute substantially to the attainment of such a goal. However, Dr. Paul Russell, WHO Malaria Consultant, explained that the Organization did not propose to embark upon extensive malaria-eradication programmes but simply to increase its aid in the form of technical guidance and encouragement to governments, which would be largely responsible for carrying out the necessary campaigns. Dr. Russell admitted that Africa presented special problems, but problems which could be solved; he foresaw that eradication of malaria might require more time in Africa than in other infected regions; but, he pointed out, Africa could undoubtedly benefit from the programmes carried out in other parts of the world. The Director-General stated that it would, of course, be impossible for WHO to undertake the eradication of malaria; the Organization had an important function, however—that of stimulating action on the

part of governments and of co-ordinating the available resources.

The Assembly delegates were wholeheartedly in accord with the steps taken by the Director-General to prepare WHO's participation in the forthcoming United Nations conference on the peaceful uses of atomic energy, and approved of the caution with which the Organization was moving in formulating a programme on atomic energy in medicine and public health.

Emphasis in the discussion was on the need for study of the problems connected with protection against the effects of atomic radiation. The delegate of Norway, for example, called attention to the problem of the "fall out", the radio-active material produced by atomic explosion experiments, and to the question of contamination of drinking water, food, plants, etc. He also mentioned a problem of particular concern to his country, a seafaring nation : Norway would be building merchant ships propelled by atomic energy, and a health problem which should be considered would be the possible dangers of such a ship's sinking in shallow water.

The delegate of Yugoslavia reported that there were three research institutes in his country which were working on the peaceful uses of atomic energy, and that these institutes would be glad to co-operate with the Organization. The delegate of France also indicated that his Government was working on the applications of atomic energy in industry and in medicine and pledged its support to the relevant activities of WHO.

The delegate of Syria expressed the hope that small atomic reactors might be built by means of funds pooled by countries unable to afford them individually, so that the "gap in the level of medical practice" between highly developed areas and the less developed areas might not be widened by progress realized in the medical applications of radio-isotopes.

Several delegates suggested that WHO should establish regional centres for training technical personnel in work with atomic energy, but it was decided that the Organisation should not yet assume such a responsibility. It was generally agreed that WHO's activity for the moment should be confined largely to collecting and disseminating information, and that the Organization's role would become clearer after the United Nations conference.

WHO's relations with UNICEF were reviewed by the Committee on Programme and Budget. Satisfaction was expressed with regard to the excellent co-operation between the two organizations, and certain difficulties relating to division of financial responsibilities were discussed. The Assembly subsequently took steps to enable WHO to assume the responsibility for personnel cost in jointly assisted UNICEF/WHO projects : $240,000 were added to the budget proposals for 1956 to provide half the cost of the international personnel in joint projects in 1956; and the Director-General was requested to include in his annually proposed programme and budget estimates, beginning in 1957, full provision for these costs.

Another subject considered by the Committee on Programme and Budget was the Organization's programme relative to poliomyelitis. Following a suggestion of the Director-General, the Committee decided that certain savings effected as a result of Executive Board action in January 1955, should be devoted to poliomyelitis activities, in a manner to be determined by the Director-General.

General Programme of Work Covering a Specific Period

The Assembly also approved a general programme of work for the years 1957-60 inclusive. Dr. H. van Zile Hyde, representing the Executive Board, outlined the main points of this programme, which included the principles of the first general programme but in a form somewhat modified by experience and stated in broader terms.

A fundamental principle was that all countries should participate in the work of Organization and should be eligible to receive assistance, and that there should be full reciprocal co-operation on the part of all countries. The functions of WHO should be confined to those that were best carried out by international action. The Organization would continue to promote and co-ordinate research but would not actually engage in research. Assistance to governments would be conducted along the same lines as in the past and would be given only in response to a specific request. The aim was to foster self-reliance, to plan the assistance so that it could be integrated with other technical, social, and economic developments in the country, and to make sure that it would be within the capacity of the country concerned and of WHO to complete the action once it had been started. The importance of inter-country programmes was emphasized. WHO should encourage the general trends towards integrated health programmes.

The professional and technical education of national health personnel should be adopted to local needs; and, in countries where it was not yet possible to provide full professional services for the whole population, the Organization should help in the training of auxiliary workers.

In summary, the new programme created a broader framework for WHO's activities and laid greater emphasis on the Organization's functions of co-ordination and leadership. More attention was paid to planning and evaluation and to the integration of health services into the general economic and social development of the community.

Assembly Decisions

In all, the Eighth World Health Assembly adopted 47 resolutions. The following were among the more significant decisions taken.

New Member—The Sudan was admitted as an Associate Member of the World Health Organization, bringing the total membership to 85.

Malaria eradication—A world fund to assist national programmes for the eradication of malaria was established. This fund, to be administered by WHO, will consist of voluntary contributions from governmental and private sources. It will be used for research and for the provision of supplies, equipment, and services to governments requiring such aid.

Atomic energy—The Assembly approved the action and the proposals of the Director-General relative to the Organization's responsibilities with regard to atomic energy in relation to medicine and public health. WHO's chief functions will be to collect and disseminate information, to give aid in the training of technical personnel, and to provide expert advice. For the moment the Organization will be primarily concerned with (*a*) the protection of populations against radiation, this including problems involved in the location of atomic energy plants, contamination of water, soil, food, etc., and the disposal of atomic waste material; and (*b*) the international aspects of training personnel for work in the medical and public health applications of atomic energy.

Poliomyelitis—The basic network of poliomyelitis laboratories which has been set up by WHO is to be enlarged. The laboratory centres, in addition to studying the various strains of poliovirus, will prepare and distribute standard laboratory reagents to facilitate the work of national poliomyelitis centres and will train virus specialist in tissue-culture techniques.

International Sanitary Regulations—The provisions concerning yellow fever were given particular consideration in this Assembly's review of the operation of the International Sanitary Regulations, and additional regulations were adopted. The Regulations were amended so that the quarantine restrictions regarding yellow fever should apply only to infected local areas, instead of to yellow fever endemic zones. "Infected local area", in reference to yellow fever, means (*a*) a local area where there is a non-imported case of the disease, or (*b*) a local area where activity of yellow fever virus is found in vertebrates other than man.

Sale of assessments—A new scale of assessments of Member States contributing to WHO's regular budget was adopted. This scale, based on the latest United Nations scale, will be applied progressively over a period of four years, starting in 1956. The largest contributor, the United States of America, will, within the same period, have its share of the budget reduced to 33⅓ per cent of the total assessments of Members actively participating in the work of the Organization.

Elections to the Executive Board—Six countries were elected to designate members to serve on the Executive Board: Argentina, Ecuador, Finland, Pakistan, the Philippines, and Portugal. The designated members will succeed the six whose terms expire this year: Professor M. J. Ferreira (Brazil), Dr. P. E. Moore (Canada), Professor O. Andersen (Denmark), Professor J. S. Saleh (Iran), Dr. H. B. Turbott (New Zealand), and Dr. M. Mackenzie (United Kingdom).

The Eighth World Health Medical Assembly closed with expressions of gratitude to the Government of Mexico, host of the Assembly, and with tributes to WHO and its work. Among the latter was the opinion voiced by the delegate of Lebanon:

> (WHO) is the only worldwide organization in which one but rarely breathes the heavy air of politics. This is shown by . . . freedom of action and of speech, and the atmosphere of fraternity and perfect democracy that prevails in the Organization. The delegates of even the smallest and weakest nation do not hesitate to discuss, question, and reject the ideas of the greatest and most powerful country, in a spirit of mutual respect and fairness. Nor are there any differences because of race, colour or creed. All are united by spirit of collaboration. . . . . .This Organisation from every point of view, serves as an instrument for world peace and mutual understanding.

NOTES AND NEWS

Gastroenterological Convention

The Annual Convention of the American College of Gastroenterology will be held at The Shoreland in Chicago, Ill. on October 24, 25 and 26, 1955. In addition to interesting individual papers on gastroenterology and allied fields, the programme will include a panel discussion on "Peptic Ulcer" with Dr. Clifford J. Barborka as moderator. There will be scientific as well as commercial exhibits.

Copies of the programme and further information may be obtained by writing to: American College of Gastroenterology, 33 West 60th Street, New Work 23, N. Y.

Index-Catalogue and Quarterly Cumulative Index Medicus Presented to Madras Medical College Library

On the evening of August 11th 1955, the United States Information Service, Madras, presented to the Madras Medical College Library a complete set of the published volumes of *Index-Catalogue* and 31 volumes of *Quarterly Cumulative Index Medicus*.

These 88 volumes of well known medical indexes were presented to the United States Book Exchange, Washington D.C., by Dr. Walter Freeman, the New York Surgeon noted for his work on frontal lobotomy. His wish was that those volumes should be channelled to a medical library in India.

Mother and Child Health Exhibition

The Vice-Chancellor, Calcutta University, opened recently an exhibition on "The health of mother and child" in the premises of the All-India Institute of Hygiene and Public Health. Col. C. K. Lakshmanan, Director-General of Health Services, Government of India, was present.

The exhibits included statistics on the growth and development of infants and on the causes of maternal and infant diseases and deaths. Patterns of rural and urban organizations for maternal and child health were also exhibited. Statistics relating to family planning were shown.

Opening the exhibition, Prof. Suddhanta, the Vice-Chancellor referred to the Institute's activities, particularly in the fields of public health, maternity and child welfare. The exhibition, which was organized by the Institute, was primarily meant for the layman, but it would also be of interest to doctors.

Dr. K. V. Krishnan, Director of the Institute, said the organization had undertaken a scheme for education in public health, and post-graduate medical students were conducting research under the auspices of the Institute, in maternity and child welfare subjects.

B. C. G. Campaign to Continue

The Central Council of Health has recommended the continuance of the B.C.G. campaign in the country "in the best interest of the health of the people" and urged upon State Governments to intensify their publicity measures to counteract the criticism against the campaign.

A resolution to this effect was adopted at the second meeting of the Executive Committee of the Council at Delhi on 17-9-55. Rajkumari Amrit Kaur presided.

The resolution which was released officially on 20-9-55 said that in the light of available scientific literature and "the irrefutable evidence in support of B.C.G. vaccination's efficacy in increasing the specific resistance against tuberculosis", as also the fact that the vaccination programme had proceeded in India since 1948 with no ill effects, the Committee was of the view that there was no need for any further inquiry into the propriety of continuing this mass campaign.

Medical Education

The Executive Committee of the Central Council of Health has urged by a resolution on 17-9-55 early finalisation of the scheme for the formation of an all-India cadre for non-clinical departments of all medical colleges and for upgrading the pay scales of other teaching staff in these colleges with a view to improving the standard of teaching.

Training in the Treatment of Leprosy

The Government of Bombay has made it obligatory on students attending Government medical colleges to attend the Acworth Leprosy Home, Bombay, for training in the treatment of leprosy and to witness lecture-demonstrations. Each student is charged a fee of Rs. 4 for the training, and the money thus collected is given to the Leprosy Home.

Medical Science Institute

The Health Minister, Raikumari Amrit Kaur introduced on September 21, 1955 in the Lok Sabha the All-India Institute of Medical Sciences Bill.

The Bill seeks to establish in New Delhi an all-India Institute of medical sciences. It will develop patterns of teaching in undergraduate and post-graduate medical education in all its branches so as to demonstrate a high standard of medical education to all the medical colleges and other allied institutions.

The Institute will also provide facilities of a high order for training of personnel in all the important branches of health activities and also for medical research in its various aspects.

T. B. Patients' Care

The Health Minister of Delhi recently explained what the Government proposed to do during the coming 18 months to hospitalise T.B. patients in Delhi.

Against the need for hospitalization of about 2,500 T.B. patients, the Health Minister disclosed, there were no more than 592 beds available, namely, 480 in the Silver Jubilee T.B. Hospital, 100 in Ram Swarup T.B. Hospital at Mehrauli and 12 emergency beds in the Infectious Diseases Hospital. In addition, there were 15 observation beds in the T.B. clinic at Irwin Hospital and 24 such beds in the Ramakrishna Mission Free T.B. Clinic. The number of beds in the Silver Jubilee Hospital would be raised to 880 by the end of the year.

There is also a proposal to have a T.B. colony with 1,500 beds besides the beds available in the hospitals. Even so, the requirements would only be partially met since the total number of T.B. patients in Delhi (not all of them requiring immediate hospitalization) was estimated to be 20,000.

The Government, therefore, proposed to set up 12-bed barracks, costing about Rs. 12,000 each, as an emergency measures. As Government resources were limited, the Minister appealed to the public to donate the cost of as many such barracks as possible.

REVIEWS

Documenta Ophthalmologica—Advances in Ophthalmology—Edited by G. von Bahr (Uppsala), J. ten Doesschate (Utrecht), H. Fisher von Bünau (Utrecht), J. François (Ghent), H. Goldman (Berne), G. Lo Cascio (Naples), H. K. Müller (Bonn), Jean Nordmann (Strasbourg), A. J. Schaeffer (Los Angeles) and Arnold Sorsby (London). (24 cm. × 15·5 cm.). Vol. VII-VIII, 1954. Dr. W. Junk, Publishers, 13 Van Stolkweg, The Hague, Netherlands. Price 125 Guilders.

This is a book combining the volumes VII and VIII of an admirable project of compiling the advances in the field of ophthalmology with the active co-operation and help of several reputed specialists in the subject drawn from many countries, and also with an international Board of Editors. The book runs to 758 pages of text comprising 14 articles mainly dealing with observations and information on retinal circulation, as well as other articles on squint, nystagmus, etc. from Netherlands symposium on strabismus. This book has been well produced, containing highly informative and very readable articles. The paper, printing and binding are also good. This book should be read and kept handy by specialists, and particularly teachers, in the subject.

Punjab Medical Journal—SPECIAL NUMBERS ON "TREATMENT OF EMERGENCIES" (June and July 1955). Published from Sodal Road, Jullundur City, E. Punjab. Price Rs. 2/- each.

These two issues contain several articles on various types of emergencies arising in the practice of the healing art. Some of the articles are quite good, with practical hints and details of techniques many of which may be carried out by the general practitioner. With a little more care in selection, some overlapping of the subjects could have been avoided and one on haemorrhagic emergencies in obstetrics included instead. A large number of printing mistakes distract the reader's mind; a close attention to correction of proofs would have eliminated most of these.

SUPPLEMENT
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INDIAN MEDICAL ASSOCIATION HEALTH SCHEME UNDER THE SECOND FIVE YEAR PLAN

PART I

The First Five Year Plan laid emphasis on agriculture and electricity. It has been estimated that the National Income has increased during this period by 3 per cent per year.

The draft Second Five Year Plan lays emphasis on "basic industry" and heavy chemicals and the target of National Income during this period has been put at 5 per cent per year.

Apart from the consideration of reaching the target of National Income it has to be recognised that increased National Income may not always raise the standard of living of the masses without definite provision for equitable distribution. According to the Report on Enquiry into the working and living conditions of agricultural labour conducted by the Union Ministry of Labour the per capita annual income of an agricultural labour works out to only Rs. 104 as against the per capita national income of Rs. 264. Moreover the realisation of that target is dependent not to any small extent, on the social and cultural development, possible for the people *pari passu* with the technical development. The health system of a nation is not only an important index of its social circumstances, but it influences, as it adversely did in the past, the over-all production and consequently also the national income. Secondly, the impact of concentration on building heavy industry is possible to be endured only when simultaneous progress is made in the sphere of social welfare including health, education etc. which bring in material wellbeing of the masses revealing thereby the objective benefit envisaged in the plan itself. If we can ensure to our masses sound health and adequate nutrition, we can do wonders, otherwise all our efforts at nation building are likely to come to naught. The problem of health of the nation can no longer be treated in isolation or relegated to the back ground.

The Existing Conditions of Health

Inspite of some progress in the First Five Year Plan in controlling Malaria and also in improving the health services to some extent and in some provinces, the public health conditions in India are none too encouraging. Though non-availability of upto date statistics makes an objective reading extremely difficult, figures noted below with special reference to two relatively developed States (like Bombay and West Bengal) prove that no satisfactory headway could be made during the First Five Year Plan period especially on the preventive side and also on measures to achieve positive health. Neither the target figures for personnel envisaged even in the First Five Year Plan period of Bhore Committee's recommendation could be arrived at.

Infant mortality rate—Though this mercury point on the trend of national health has come down from 122·8 per 1000 live births in 1949 to 115·9 in 1954, the comparative figures of 30 in U.K., 20 in Holland and Sweden, 25 in Japan, 29 in U.S.A. and 10 in U.S.S.R. (*Indian Journal of Pediatrics*, vol. XXII, March 1955) indicate that a big gap lies as yet between political freedom and its social correlatives through application of science. The Public Health Report of Bombay points out that "the proportion of infant deaths to total deaths has remained remarkably constant" (page 9, 1953). This statement is supported by the grim fact that 42 per cent of the total deaths in India are constituted by the infants and children below 5 years (*Indian J. Pediat.*, March 1955, p. 56).

Maternal mortality—Roughly about 200,000 mothers lose their lives during child birth every year as the result of what is and should be a normal physiological function. In West Bengal only 122·4 women per 1000 births are confined in hospitals. According to Dr. Sushila Nayer, the Minister of Health, Delhi State, "maternity and child welfare centres in our country are not catering for more than 5 to 10 per cent of our mother and child population" (*Ibid*, page 58).

Deaths from preventable diseases still constitute a major portion of the total deaths even in comparatively developed States :

It should be noted in this connection that the largest number of deaths are usually grouped under "Fever" and "Respiratory Diseases" a good proportion of which under well developed health services and a better system of collections of vital statistics especially in rural areas may be proved to be preventable.

Water supply position—It is worthwhile to note the following remarks made in the Report of the Union Ministry of Health for the year 1954-55 that "protected water supply and better drainage and sanitary arrangements are the crying need in many parts of India and are necessary for preventing the scourge of waterborne diseases. In several cases, however, where the schemes have been included in the Five Year Plans of the States, not much headway has been made either for want of tech-

States	Bowel diseases, Cholera, Enteric Diarrhoea and Dysentery	Malaria	Tuberculosis	Total including others	Total Deaths
Bombay (1951)	48,746	29 122	25,500	103 398	618,681
West Bengal (1954)	27,500	27 500	7,500	55,700	...
M P. (1951)	21 328	216,672	...	253,228	450,379
Uttar Pradesh (1953)	45,614	119,223	10 896	...	...
Mysore State (1952)	10,169	...	3,242	11,820	...

nical personnel or due to difficulties in obtaining equipment and materials or even lack of funds" (p. 67).

Although the Central Government has taken up this vital problem concerning public health under the National water supply scheme and has allotted a sum of Rs. 18 crores for the improvement of water supply in different States, the amount seems to be too insignificant as compared to the needs and the gravity of the situation. According to the Public Health Report of Bombay (1953) "the prevention of cholera is essentially dependent upon the provision of a safe water supply both in rural and urban areas. It has been estimated that the cost of providing a safe water supply in all the towns and villages of Bombay with the exception of villages below 200 population would be about 54 crores of rupees. If this is spread over 15 years period, the annual expenditure should be of the order of 3·5 crores of rupees. Schemes are under execution and a more determined effort is called for to find funds in the Second Five Year Plan for the provision of a safe water supply on a planned basis giving it the topmost priority" (page 2).

It may be noted that out of 236 Municipalities in the State of Bombay 91 have piped water supply of which "only 44 received adequate protected water supply" (*Ibid*). Similarly out of 142 towns in Madhya Pradesh only 22 had piped water supply in 1951 (P. H. Report 1951). In the State of West Bengal 37 out of 81 Municipalities have water works and 17,718 out of 35,063 i.e. about 50 per cent of the villages in this State are without any protected sources of water supply (reported by the Directorate of Health Services, *Statesman*, dated 6-5-1955).

Speaking on the problem of Cholera epidemic in the city of Calcutta, the Health Officer, Calcutta Corporation stated, "the most important single factor contributing to the spread of the disease was the scarcity of filtered water and the dual system of water supply" (*Statesman*, 19-5-1955).

In Hyderabad State death from Cholera alone was 21,723 in 1953-54. According to Madras State Branch's opinion "principal causes of death in the rural areas are Malnutrition, Anaemia and water borne diseases".

In Uttar Pradesh in 1953 death from Cholera alone was 11,155 and the same from Dysentery and Diarrhoea was 34,459.

In Orissa, in the year 1953 there were 18,206 deaths from Cholera and other gastrointestinal diseases.

From the aforesaid figures and statements it proves beyond doubt that the absence of safe water supply constitutes one of the most serious menaces which threaten the health of the nation.

Caloric intake—Since 1952 the position of India with regard to per capita caloric intake per day has been the lowest amongst almost all the nations of the world. In 1954 it was 1641 (*Eastern Economist Annual No.*, 1954).

Unemployment and malnutrition—Modern concept of scientific medicine allows no planner of health to ignore the basic question of nutrition threatened by the rising problem of mass unemployment in India. Evidently, no amount of money and energy employed in developing the health services can raise the standard of health effectively without simultaneous attempt to solve the problem of unemployment.

Increasing dependency on hospitals—Scientific medical relief to-day has developed to such a standard that it is no longer possible to make it available to the average citizen on the basis of individual financial resources even in economically developed countries. Added to this major shift in the approach to scientific medical aid, India faces some other difficulties such as unemployment, high cost of living in urban areas and low price of agriculture produce and consequent low buying power of the peasantry etc. as a result of which there has been tremendously increased dependency on the hospitals and institutional treatment. This is especially noticeable from the attendance of the out patients' departments. In Bombay the number of attendance was 15 lacs more in 1953 than what it was in 1951. Whereas the daily average attendance was 529,690·24 in 1951, in 1953 it rose to 737,118·6. Similarly in West Bengal the attendance of patients in hospitals suffering from Tuberculosis, Malaria and gastrointestinal diseases rose from 1,684,683 in 1951 to 1,746,911 in 1953.

Shortage of beds especially for Tuberculosis, Infectious Diseases, Maternity and Child cases has become a formidable hindrance to the availability of opportunities offered by scientific advancement and also to the application of the existing national resources. In spite of comparatively better position in some of the States, the over-all position still stands at 1 bed for 3000 persons (total 112,000 in 1954), a position far behind to what was envisaged in the First Five Years' Plan drawn up by the Bhore Committee (183,000 for 330 million i.e. roughly 1 bed for 1,800 persons).

Practical experience has also proved that a large number of private and government institutions in quasi urban and rural areas fall far short of the uptodate standard of medical relief mainly due to lack of funds and equipment and also due to incoordinated administration. As a result, compared to the capital investment, the outturn has been extremely uneconomic and unhelpful.

The plea of shortage of trained medical personnel on the other hand seems to be only partially true as in some provinces e.g. West Bengal unemployment amongst the medical profession has been rising steadily due to obvious lack of equitable distribution of cadre on all-India basis. It however does not mean that there is no need for increasing the number of doctors; we need more doctors and especially nurses but what is more needed is to employ them gainfully along with expansion of the field of work according to an accepted National Health Plan.

PART II

The Proposed Scheme

From what has been stated above it is clear that any future plan for the improvement of the existing health standard of the nation must have the following clear cut objective—

(1) Prevention of illness.

(2) Rendering scientific medical relief irrespective of individual financial resources.

(3) Undertaking measures for achieving positive health.

(4) Spread of Medical Education and Medical Research.

It is needless to point out that better curative measures can never yield the desired results without a bolder approach towards prevention of illness and achievement of positive health. Further, a comprehensive health plan must be a part of a co-ordinated planning and simultaneous drive for full employment, increased buying power of the masses especially the vast number of downtrodden peasantry, improved communications and compulsory free primary education. We support the "scheme for unemployment benefit in the form of attendance at training centres" as envisaged in Mahalanobis Plan, but this should be operative not merely in urban areas but also in rural areas, where live 75 to 80 per cent of our population.

Considering that the details of the planning have to be worked out by individual States on the basis of local objective conditions and specific requirements, a perspective of broad principles only is given below which may be amended to offer a discussion on State level.

A. NUTRITION :

(a) *For mother and child* : A minimum standard of nutrition preferably in the form of milk has to be supplied through ante-natal and post-natal clinics and milk kitchens to all expectant and nursing mothers and to infants upto the age of at least 2½ years. This can be effected through a National Milk Supply Corporation sponsored by the States.

(b) *School children* : Compulsory free mid-day tiffin containing adequate biological protein should be provided to all school going children.

(c) *Students Health* : The deteriorating health condition amongst the student community continues to be a cause of national anxiety. Students Welfare Committee, Calcutta University (now known as the Board of Health) in their twenty-sixth annual report for the period 1948-50 came out with the information that 55·8 per cent of the college students required immediate medical attention. Surveys conducted by other similar organisations reveal the same unsatisfactory state of affairs. Special organisations with the help of the medical profession must be set up to tackle this question. Existing organisations already working with great handicaps for this purpose, must be substantially helped by the State and Central Governments.

(d) *General* : (i) Production of protective food, e.g. milk, eggs, fish and meat shall have to be increased planfully by encouraging co-operative farming of animal husbandry.

(ii) in order to facilitate better consumption of these types of food by the people in general it is not only necessary to raise the income of the low income group, but a systematic propaganda on the nutritive value of food is also essential.

(e) *Agencies for implementation* : The existing social services organisations should be expanded and their number increased. Specific financial aid should be given to the local bodies i.e. Municipalities, District Boards, School Boards etc.

B. WATER SUPPLY :

The greatest hurdle in proper execution of the National Water Supply Scheme is the question of finance. In this connection it is interesting to note the following remarks made by the W.H.O. Expert Committee : "the annual cost of typhoid fever, diarrhoea and enteritis for 100,000 inhabitants has been estimated at $58,265. On the other hand, the installation of proper water supply and sewage systems for the same population would cost $138,000. It would thus appear that the savings to be derived from the reduction of diseases would pay off the cost of the installation in the short span of 3 years."

It is clear from the above statement that the scope of functioning of the National Water Supply Scheme should be expanded boldly with the object of providing safe water at the rate of at least 30 gallons per head per day to the urban population and one tubewell for every 200 persons in rural areas. It is however recognised that in some areas tube wells are not suitable and alternative methods have to be determined depending on the local condition. Operation of the scheme should start from endemic and scarcity areas. A National Water Supply Corporation under the aegis of the Government should be set up for this purpose which apart from the public finance available may raise loans inside the country as well as from international bodies like W.H.O., UNICEF etc. Substantial grants should be provided immediately by the Union Government to the states which have already initiated water-supply schemes in their respective areas.

In the rural areas maintenance of tube wells is an important factor which can be effected by establishing and encouraging local popular machinery which can take charge of the same.

C. MEDICAL RELIEF :

It has already been pointed out that in view of the nature of modern scientific medical aid and the present economic structure of the society the system of medical relief has to be reorganised in such way as would provide facilities to the maximum number of people. The basis of such organisation should be—

(a) Free medical aid to
  (i) all unemployed adults and all urban and rural non-earning dependants
  (ii) all the agricultural labour, the peasantry and the rural poor including the village craftsman.

(b) Contributor Health Insurance Scheme for the urban industrial as well as non-industrial employed population and also for those sections of rural population who do not come under the category (a) (ii).

(1) *Hospital Beds* :

(a) Total number of Hospital beds must be increased 200 per cent i.e. 336,000 or roughly 350,000 in 1960-61. From the experience of West Bengal it has been amply proved that even with 1 bed per 1,210, as it stands at present, there is still acute dearth of beds both in urban and rural areas.

Special emphasis should be given to increase the beds for tuberculosis, leprosy, infectious diseases, maternity and pediatrics. Note should be taken of W.H.O.'s recommendation for cheap construction for Tuberculosis and Infectious Diseases Hospitals.

(b) Proper utilisation of beds and institutions should be made through standardisation of the existing hospitals by providing proper equipment, specific medicines and suitable personnel, so that no unnecessary congestion takes place in the city hospitals.

(c) Establishment of Rural Health Units at the rate of one per 2 Unions and/or Taluks should be implemented planfully so as to reach the target by the specified period. Proper assistance, both financial and technical should be given by the Centre with particular bias to those States which have not yet made any satisfactory progress in this respect. A special Board should be constituted under the Union Government for proper planning and check up of the Rural Health Scheme.

(2) *Personnel* :

(a) *Nurse and Midwife* : Topmost priority should be given to increase the number of nurses and midwives. The present ratio of 1 nurse to 43,000 and 1 midwife to 60,000 population must at any cost be raised to 1 to 2,000 and 1 to 8,000 respectively. Every standard city hospital as also the district and sub-divisional hospitals should be utilised as Nurses' Training Centre, whereas the Rural Health Units should be used as training centres for midwives and trained Dais.

(b) *Registered medical men* : The present number of 65,000 should be increased to 100,000 by 1960-61 taking full care that the production of doctors be proportionate to the scope of employment offered every year.

	Existing position.	Bhore Committee's recommendation in 10 years.	Proposed Target in the Second Five Year Plan.		Position in Great Britain.
			Number	Population served by each	
Beds	1 : 3000	1 : 971	350,000	1 :1000	1 : 141
Doctors	1 : 5000	1 :2000	100,000	1 :3000	1 :1000
Nurse	1 :43000	1 : 500	165.000	1 :2000	1 : 300
Midwife	1 :60000	1 :4000	66,000	1 :5000	1 : 618

D. SOCIAL WELFARE :

(a) *Creche*—Every industry and business house employing women must have creche maintained either by itself or jointly by several enterprizes. Creches and Nursery Schools should also be organised and run by the State for the benefit of unorganised section of women labour and employees. All these should be co-ordinated and supervised by a Board of Maternity and Child Health under the direct guidance of Union Ministry of Labour and Health.

(b) *Old age and invalidity pension*—A start must be given some where preferably through the Employees' State Insurance Corporation and other Health Insurance Organisations in initiating an old age and invalidity Pension Scheme.

(c) *Family planning*—We support Family Planning as individual policy on medical and economic grounds; but do not support it as a National policy to solve the question of food shortage. We believe, with improved methods of agriculture, utilisation of available land; food technology, prevention of waste and above all equitable distribution of food material, the food problem of the country could be easily solved to-day and for many years to come.

(d) *Housing problem*—No less important is the question of housing. The Union Labour Ministry's recommendations of a one room tenement cannot be supported. It is not only undesirable from the point of view of physiological hygiene, but also from the important point of view of sound mental development of the children living in the same room. We recommend that there should be a minimum of a two room tenement.

BASIC CHEMICAL INDUSTRY :

"Owing to the prevalent unplanned economy in the country, there has been a considerable amount of lop-sided development. That which goes by the name of pharmaceutical and chemical industry in India is largely an industry concerned with the production of goods for which starting materials and intermediates have to be imported. This is not only dangerous for a country in times of war but is also prejudicial to the economic production of the essential commodities needed for a nation's life and health. Unless the basic chemical industries are developed in the country, the economic production of fine chemicals, drugs, dye-stuffs, explosives etc. is impossible. The industry we have is like a jerry-built house. Chemical industry has to be visualised as a chain of interlocking industries in which the by-products of one is the raw material of another. Unless this interlocking is ensured, the entire industry tends to be uneconomic. The development of scientific coal carbonisation and the coal-tar distillation industry on a national scale is an absolute and urgent necessity. It is unfortunate that this was practically neglected in the first 5 Year Plan. If we wish to place the drug PTO industry in India on a sound, scientific and economic basis, it is necessary that these basic industries as well as the production of industrial solvents form part of the Second 5-year Plan."—Quotation from the Presidential Address of the Bengal Provincial Medical Conference held in February 1955.

MEDICAL EDUCATION :

A. *System of Medicine to be Recognised by the State*—Medical Education is of the greatest moment in relation to the health and welfare of the present as well as future generation, on whom the power and prosperity of our nation will depend. The scheme of training which we should adopt, therefore, should be unprejudiced by consideration of sentiment and should be based solely on scientifically tested knowledge. The Modern Scientific system of medicine is based on the well-known methodology of science, namely experimentation and observations with proper controls, which alone should be recognised by the State. It may be pointed out that empirical methods of treatment were also prevalent in all other countries and with the progress and enlightenment of those countries, empiricism has been steadily replaced by the scientific system of medicine. There have been attempts in this country to give a semblance of science to indigenous system of medicine by providing laboratories and disection of human bodies etc., but the correct course should be to accept the Modern Scientific medicine as the nucleus round which only the scientifically tested knowledge derived from indigenous system of medicine should grow and for this purpose a course of special study and research on Indegenous Medicine should be made available to those who are already qualified in modern Scientific Medicine.

B. *Our Requirements regarding Medical Colleges and Medically Trained Men*—In formulating a scheme for medical training, it is important to consider

(i) the aim which we wish to achieve in course of say next 25 years, which should bring us at least on a par with Western communities, and

(ii) the requirements of our people during the transitional period, which are consistent with the aims of continued progress on scientific lines.

It is well known that the number of medically trained men in this country is extremely inadequate for the population of India. It should be our plan to have one medical man per 1000 of the population. At the moment the bulk of the medical men are stationed in the cities and towns so that there is a great scarcity of scientific medical help in rural areas.

The requirements are :

(1) A very much larger production of scientifically trained medical men,

(2) their even distribution throughout the country

If we plan for the present to produce one doctor per 3,000 of the population in course of the next 5 years then we have to turn out about 7,000 medical men each year. This number is not adequate, because it includes medical practitioners, specialists, research workers, and public health men but may be made a working basis for the 2nd Five Year Plan. For turning this number each year about 70 medical institutions will be necessary assuming each institution to be able to deal with such number of students as will enable 100 people to pass out in the final examination each year. At present there are not more than 35 medical colleges in India. In order to expand this number into 70 these institutions as far as possible should be *evenly distributed throughout the country*, with proper consideration given to the density of population in different areas. What is needed is to sufficiently expand the existing district hospitals round which these institutions can grow. This would (1) modernise the hospitals, (2) provide centres for medical training, (3) help to maintain and improve the standard of urban and rural medical practitioners and (4) impart progressive outlook to the whole district population particularly with reference to hygiene and public health. It should of course be remembered that students will come out as doctors from these newly started medical colleges after six years, as such the position after six years will be definitely better. However during the period of the Second Five Year Plan the number of doctors could be raised to 90000 if only we refuse to allow wastage of medical material. At present the percentage of pass in the final M.B.B.S. Examination, on the average is about 40 per cent. Best students are generally admitted in the Medical Colleges and after intensive study for five years, there should be no question of failure, not to speak of 60 per cent failures. As a matter of fact in U.K., U.S.A., U.S.S.R. and other European countries the percentage of pass is from 85 to 95 per cent. With proper teaching methods and appointment of sufficient teaching personnel this standard could be easily achieved almost immediately.

Once the above is done, with very little increase in the over-all cost and with the existing Medical Colleges,

the number of students passing every year could at least be doubled i.e. to 7,000 a year. There are no actual figures available for annual loss from the total number due to death and retirement. On a rough calculation it would be about 1500 a year. So that the next annual gain comes to 5500. In five years the addition will be 5500×5 —27500. The present (1954) number of doctors in India is 65000. Therefore the total by the end of Second Five Year Plan comes to 65000 plus 27500 and 2000 (addition for 1955) comes 94500. It may be argued that the bulk of the present accumulated failed candidates will pass out in the first three years and there will not be the same number available during the next two years. Even if the total number is diminished by 4500 for this factor just stated, the total number comes to at least 90000 by the end of the 2nd Five Year Plan period.

Professor Mahalanobis in his Plan stated that his target is also 90,000 by the end of the 2nd Five Year Plan, but at the same time has suggested four and two years courses respectively for the production of Health Assistants (doctors) apparently to make up the 90,000 as envisaged in his Plan. The Plan also suggests that one qualified doctor will be (along with the health assistants) in charge of 10 N.E.S. blocks, i.e. 10×5×2=100 villages which roughly would include about 40,000 people.

According to the calculations made by us and as stated above, for achieving 90,000 doctor target, there will therefore be no need to turn out insufficiently qualified people (the four type of Professor Mahalanobis) during the interim period. We agree that the large number of health assistants will be required to work under the guidance of qualified doctors and for this purpose the two year programme of auxiliary personnel suggested by Professor Mahalanobis will be necessary. For this purpose our definite proposal is that we train by legislation the 200,000 unqualified practitioners of scientific medicine to take up the cadre of this auxiliary personnel. This will at once stop quack practice and with well thought out two years training, provide useful and dignified avocation for them. The district hospitals, which must be upgraded immediately, should be utilised as training centre for these Health Assistants (two years course).

We are definitely opposed to the idea of handing over the treatment of the poor people of the rural areas to underqualified persons. It will be unscientific to state 75 per cent of all illness could be covered by simple remedies that could be handled by partly qualified men. Any system that would endanger the health of 25 per cent of the rural people cannot and should not be supported. Good health cannot be left to the good luck of the people!

Unemployment among doctors—Due to absence of a coordinated National Health Policy, even to-day in some States there are large number of doctors who are actually unemployed or partly employed. It must be understood that *pari passu* with the increase in their number they must be gainfully employed within the frame work of the overall National Medical relief scheme.

C. (i) *Medical Teaching Institutions or Colleges for Undergraduates*—It is desirable that our aim should be to fix a uniform adequate standard for medical education in this country. The distinction between medical schools and colleges, as at present existing, should be removed. All institutions should be called colleges. The colleges which are situated in the most populous centres should for the present have organised post-graduate colleges meant for (i) Research, (ii) Specialisation and (iii) Training of teachers. This, however, does not and should not preclude other medical colleges not having organised post-graduate departments from doing research work on specialised studies.

In admitting students, all medical colleges must be thrown open to both sexes and women should be particularly encouraged to come in for medical training as they are specially suited for preventive, maternity, child welfare and school hygiene work for which large number of personnel will be required.

The provision of teaching staff for these institutions is an important consideration. Teachers will naturally be required to know much more than they teach. If a total of 35 new institutions were to be started in one year in the country then there would obviously be a dearth of teachers and even of students fit for receiving the medical training. But if an attempt is made in reaching this consummation by an *addition of 7 colleges every year* then the number of institutions, which can be started during the next 5 years is not likely to lack teachers. The appointment of trained experienced medical men, some of them having post-graduate training, as teachers in these district institutions would at the same time help the even distribution of medical men who are now largely concentrated in big cities. Prevailing unfortunate bias in some cases in selecting teachers depending on extra academic factors must be abandoned if this expanded scheme is to provide maximum scope for all concerned.

(ii) *Post-Graduate Training and Researches*—The aim of post-graduate medical education should be to promote basic and sustained researches and concomittantly to provide a continuous supply of teaching personnel and specialists. At present three types of institutions exist for this purpose, viz., (a) Medical Colleges where post-graduate training and researches are carried out; (b) Institutions with several departments concerning fundamental sciences like Bacteriology, Protozoology, Biochemistry etc. like for instance, Calcutta School of Tropical Medicine, All-India Institute of Hygiene and Public Health and Indian Institute for Medical Research; (c) Institute, exclusively devoted to research in a particular field like Malaria Institute, Nutritional Research Institute, etc. In the 2nd Five Year Plan besides improvement and upgrading of these types of institutions, Post-Graduate Medical Institutions for training of teachers and specialists should be incorporated.

MEDICAL COLLEGES :

Post-Graduate training facilities and research in the Medical Colleges are very meagre at present. This has created a stumbling block in the training up of teachers and research workers in our country. Lack of these facilities leads many a person to go abroad for training which entails great wastage of time and money. Scope for the advanced study and research should be available in the Medical Colleges, affiliated to the University so as to foster the spirit of research from the beginning of the students career. Needless to say that without such organised post-graduate division in the colleges, the standard of teaching cannot be maintained up to the mark.

Workers specialising in particular lines should be entitled to a diploma of the particular line after definite course of study and work in hospitals, the period of which may vary according to requirements. Those post-graduate students who after receiving the diploma, desire to proceed for research should be entitled to a Doctorate after presentation of thesis.

At present University control over its affiliated medical colleges consist only in formulating a curriculum and in taking periodic examinations. This system seems to be defective because University has got no vigilance over the actual teaching of the students in those institutions. To obviate this defect it is primary imperative that the teaching of the students at a professorial level should be under the direct contact of the University who should appoint and finance the professors in those institutes. Administration of the hospitals should be left to appropriate authority. Improvement and upgrading of the medical colleges should be done specially in the following lines—

1. Standardisation of all educational institutions and attached hospitals as well as district hospitals on Nation-wide basis. This will establish a more or less uniform standard in the country.

2. Upgrading of the teaching arrangements by :

(a) Whole-time appointments of professors and teaching staff;

(b) Appointment of professors from foreign countries whenever necessary for a specified period of time to develop any department;

(c) Providing equipment and appliances for building up of different departments particularly to provide research facilities, whenever necessary.

3. Increase the potentialities for training of the laboratory assistants, nurses, physiotherapists, dietetitian, occupational therapists, social service and child guidance personnel. Moreover, training programme for these personnel should be augmented specially in various district hospitals which should be upgraded and equipped with modern appliances and adequate teaching staff.

POST-GRADUATE MEDICAL INSTITUTES :

Need for the teachers, specialists and research workers in our country will be so great in near future that the existing medical colleges even after upgrading may not cope with the demand at present. In order to circumvent this shortage, it is desirable that a few post-graduate medical institutes, where training for the teachers and specialists will be undertaken, should be started immediately, so that after a reasonable time they together with the post-graduate departments of the medical colleges, shall be able to produce enough teachers and specialists. At present this two-way approach has to be utilised to supply enough trained personnel and these cannot be left to either alone.

These institutes should preferably be situated on a zonal basis, at present at least 4 in number. They should better not be linked with undergraduate colleges and should have their own hospitals. For the personnel, if available talent is deemed inadequate, every effort should be made to invite experts from other countries on contract basis for development of a particular department and for training of personnel locally. There has been a move in this line to establish one unit at Delhi and one in Calcutta. Actual details should be left to the experts but proper fund should be alloted for them.

RESEARCH INSTITUTES :

Medical Research should form an essential and central part of the scheme for the medical progress of this country. There should be a Central Medical Research Council with as many Advisory Boards as necessary concerning different subjects. The Central Medical Research in co-operation with the Advisory Boards should determine (1) the lines of development of existing research institutions and (2) the establishment of new institutions. The institutions should concern themselves both with pure and applied research. These institutions should be of two kinds : (1) Institution with several departments concerning fundamental sciences like Bacteriology, Protozoology, Biochemistry, etc. like for instance, the Calcutta School of Tropical Medicine, the All-India Institute of Hygiene and Public Health, the Indian Institute for Medical Research, Calcutta, etc. and (2) Institutions exclusively devoted to research in a particular line like, for instance, Malaria Research Institute, Cancer Research Institute, Nutritional Research Institute etc. These institutions should work on the advice of the respective Advisory Boards. There should also be facilities at these institutions for post-graduate teaching, but not to the detriment of research, for which these institutions should be primarily meant. These institutions should preferably have their own hospitals or be linked with some nearby existing hospitals. Such institutions need not be numerous and they should be established with special reference to the localities where they are suitable from the standpoint of materials and resources available. There should be no objection to having two research institutions dealing with the same object in different provinces; such overlaping is rather desirable at times. Apart from these research institutions, it is desirable to have one All-India Medical Research Institute, which will deal with all fundamental subjects and with medical subjects affecting the largest number of people and which might at the same time function through a Bureau as a co-ordinating organisation for the different research institutions of the country. Its function should, however, be only to co-ordinate and not to command. The selection of research institutions, which should be started now and the development of the medical research institutions already existing are matter of detail and should be gone into by a Central Medical Research Council.

In the 2nd Five Year Plan, besides the existing institutions, there is an urgent need for at least the following organisations :

(1) Type Culture Institute;

(2) Tuberculosis Research Institute;

(3) Institute of Pharmaceutical and Synthetic Chemistry;

(4) Enteric laboratory;

(5) Public Health Institute in every State for research and training purposes.

RESEARCH TRAINING :

In the field of research we envisage that there should be extensive training of medical personnel and of allied scientific subject, both in this country and abroad. A batch of students should be trained in a particular line of problem so that they may initiate sustained research in that line. There are various aspects of medical sciences such as, Histochemistry, Cytology, Genetics, Immunochemistry, Endocrinology etc. which have never been tackled in this country and for furtherance of the cause of science, each and every aspect has got to be investigated in near future. Considering this fact, provision should be made for intensive training in medical science for at least 300 students each year for this purpose.

PART III

APPENDIX A

ANTI-TUBERCULOSIS MEASURES :

(1) By 1960-61 every district should have one fully equipped and adequately staffed Chest Clinic and 50 bedded Isolation Hospital. There should be facilities for Chest Surgery in some Zonal Hospitals in each province. Every Sub-division should have a chest clinic with 10 beds. Each clinic should have under it a number of Units with facilities for *domiciliary treatment.*

(2) Suspected tuberculosis cases should be referred from Thana Health Centres to the District or Sub-Divisional Chest Clinic and arrangements be made in Thana Health Centres for treatment of these cases on the lines recommended by the District or Sub-Divisional clinics and at least 4 isolated beds should be provided for tuberculosis cases in Thana Hospitals.

(3) There should be one Mobile Diagnostic Unit operating within each district to assure continuity of work.

(4) Provision for isolation blocks for infective cases in all labour quarters should be made compulsory by amending the Factory Act.

(5) The Employees' State Insurance Corporation and other Insurance bodies should have their own Chest clinics and isolation centres.

(6) In cities like Bombay, Calcutta, Kanpur, Ahmedabad, Madras etc. there should be one Chest Clinic for every 50 thousand population and 100 bedded isolation centres in 4 di :erent parts of the city.

(7) Arrangements for free X-ray and Laboratory facilities and supplementary nutrition must be provided to all the indigent patients.

(8) B.C.G. Vaccination should be made compulsory to all children in urban industrial areas.

APPENDIX B

MEASURES AGAINST INFECTIOUS DISEASES :

(1) In addition to expansion of National Water Supply Scheme which must be completed by 1960-61 effective inoculation and vaccination drive against Cholera, Typhoid and Smallpox should be undertaken rigidly. Past experiences have proved beyond doubt that the existing machinery under Government, Quasi-govt. bodies are incompetent to fulfill this task without the help of popular social service organisations. As such liberal financial and technical assistance to such organisations including students' unions would be the most important part for successful operation of inoculation and vaccination drive.

(2) Pending completion of the safe water supply scheme there should be 4 to 6 isolation beds in every Thana and Sub-Divisional Hospital in endemic areas and at least one mobile unit under each thana, with facilities for transportation of patients. Similarly each industrial city must have at least one well equipped infectious diseases hospital and several isolation centres in different regions.

(3) *Question of Leprosy*—For control of leprosy, since wholesale isolation of infective cases is not possible, community should have—

(1) Modern hospital with sufficient beds in the city or its suburbs with easy transport, for isolation and treatment of infective cases.

(2) The hospital should have as pleasant surrounding as possible with facilities for private wards and for modern treatment so that aflicted people of all strata of life may come in increasing numbers and are not obliged to hide their disease and thereby spread infection by uncontrolled movement as they are doing now.

(3) Hospitals with a brighter outlook and if possible inside the city—to remove the unscientific attitude towards the disease, with arrangement for more humane and scientific treatment should replace the existing asylums where a leprosy patient is not treated but allowed to live a condemned life till death.

(4) Isolation colony is necessary particularly for those cases who, under the existing socio-economic condition of society, are not considered to become, even when rendered non-infective, a socially useful individual.

(5) Non-infective cases are to be treated in the out-patients clinics of special or general hospitals and by the profession as they treat any other disease.

Above all, we members of the profession must learn to change our and help others to change their unscientific and mediaeval attitude of dread and hatred towards a case of leprosy. Question of leprosy control is a challenge of dogma and superstition to science and humanity. The medical profession should be prepared to accept the challenge.

PART IV

FINANCIAL IMPLICATION OF THE PLAN

(1) *For providing adequate and safe water supply*			150 crores
Rural area	100 crores		
Urban area	50 „		
(2) *Nutrition*			25 „
Mothers	10 crores		
Children	15 „		
(3) *Establishment and Expansion of Hospitals (both rural & urban)*			200 „
Tuberculosis	25 crores		
Infectious diseases	25 „		
Maternity	25 „		
Mental	2 „		
Medical Colleges, Pharmacy College, Nurses Training Centre, Auxiliary personnel	123 crores		
(4) *Pharmaceutical Industry*			100 „
(5) *Research*			125 „
In Medical Colleges	25 crores		
In Research institutes (State & Union)	100 „		
(6) *Public Health activities* Malaria, Filaria, Leprosy, B.C.G., Creches for Children etc. etc.			100 „
Total			700 crores

Science has contributed, in the course of the last 50 years or so, the knowledge and equipment necessary to rid the world of many of its most widely spread communicable diseases. The application of this knowledge is now a question of Education, economics, organisation and administration.

India's health status has been low for many decades, so also her standard of living. Successive scientific discoveries and their application in Western countries seem to have had little effect in our country. The lack of a scientific outlook, inadequate investigations by the administrative authorities in developing suitable methods of organisation and the lack of a national policy of co-ordinated planning have been responsible for much of India's backwardness.

India is bound to be industrialised. When a country changes from agricultural to industrial economy, the social structure undergoes radical changes. No improvement of health status can be achieved without the simultaneous development of programme of national reconstruction in the field of agriculture, animal husbandry, education, industry, housing and improvement of communication. Without realisation of an integrated development the improvement of health of the Nation may remain an unattained objective,

After all human element is the prime mover; even with adequate financial resources and without popular co-operation, no plan can succeed. The popular incentive and intensive drive must be there, in all national enterprise, if it is to succeed. Public co-operation and public opinion constitute the principle force and sanction behind any planning. There has been a lamentable failure in raising that popular enthusiasm in different spheres of social reconstruction during the first five year plan. Let us not repeat the same during the second.

BRANCH NOTES

ALIGARH BRANCH -A meeting of the branch was held on 6-8-55. Nine members were present. Dr. Lekhraj Singh was in the chair. Dr. Satyawati Sharma was nominated on the Advisory Committee of the District Hospital.

AMRELI BRANCH—Office-bearers for the year 1955-56 were elected with Dr. N. G. Doshi as the president and Dr. Maheshkumar S. Bhatt as Secretary. The annual report of the branch for 1954-55 shows that 12 ordinary meetings were held. Lectures and clinical demonstrations were also held during the year.

BANGALORE BRANCH—On 3-8-55, a meeting of the Executive Committee of the branch was held under the presidentship of Dr. M. Sirsi and it was decided to hold a Refresher Course from the 26th of September to the 1st of October 1955.

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On 13-8-55, an extraordinary general body meeting was held and delegates for the State Medical Conference were elected. Dr. N. Srinivasa Rao addressed the members on "Surgery in Yugoslavia". Dr. N. A. Iyengar presided.

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On 20-8-55, a discussion on B. C. G. Vaccine was arranged and Drs. B. A. Srinivasa Iyengar, P. Krishna Rao and B. Jayaram participated in the discussion.

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On 27-8-55, Dr. John Hoenig, M.D. gave a talk on "Central Mechanisms of Some Disorders of Movement". Dr. M. A. Hafeez presided.

BIJAPUR BRANCH—A clinical meeting was held on 18-8-55 with Dr. Mangalvedhekar in the chair. Two interesting cases were demonstrated by Dr. Mahindrakar.

CALCUTTA BRANCH—A meeting of the executive committee of the branch was held on 12-7-55. Twenty-one members were present. The meeting condoled the death of Dr. Bamandas Mukherjee. Nine new members were admitted. The reports of the Sub-Committees were accepted. The National Medical College Students' strike was discussed and a committee was formed to bring about a suitable settlement in this matter.

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An emergent meeting of the executive committee was held on 20-7-55. Nineteen members were present. The Secretary reported on the development in C. N. M. I. Students Hunger strike and the steps taken by the I.M.A. Special Committee.

CHICKMAGALUR BRANCH—A meeting of the branch was held on 24-8-55. Dr. Mirle Puttaiya presided. The members bade farewell to Dr. S. D. Narayan Gowda, on transfer to Bangalore.

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A general body meeting of the branch was held on 11-9-55 with Dr. H. D. S. Acharya in the chair. Office bearers for 1954-55 were elected with Dr. Mirle Puttaiya as president and Sri B. K. Venkataraman as secretary.

COIMBATORE BRANCH—A meeting of the branch was held on 29-7-55. Dr. Major R. S. Rao presided. Fortyfive members were present. Dr. V. P. Vasuvedan was congratulated on his being elected the president of the Madras State Branch. The meeting regretted that the report of the Committee on cases of complications after B. C. G. Vaccination in Coimbatore was not communicated to this branch. Dr. D. Sundareswaram gave a talk on "Some Ophthalmic Problems of the General Practitioner".

GHAZIPUR BRANCH—A meeting of the branch was held on 28-7-55. Dr. T. N. Dutta read a paper on "Some Less Known Effects of Rauwolfia Serpentina".

GORAKHPUR BRANCH—A meeting of the branch was held on 31-8-55 under the presidentship of Dr. K. N. Srivastava. Thirty members were present. In the opinion of the house, concession of Railway travelling should be extended to the bonafide delegate attending the State Medical Conferences as it is allowed in the A. I. Medical Conference. A rare case of Keratoconus with budging of Cornea with Images Peripherally was cited by Dr. Sett. Films on High Blood Pressure, Cardiac Asthma and Antibiotic in T. B. cases were shown.

GURGAON BRANCH—A meeting of the branch was held on 21-8-55 under the presidentship of Dr. Jagjit Singh. Twenty members were present. A case report of Arsenic Poisoning following indiscreet use of intravenous N. A. B. by quacks was read by Dr. L. K. Kochhar. Dr. Hari Ram read a paper on Coronary Thrombosis. A few heart cases and skiagrams were shown by Dr. D. P. Puri.

KATWA BRANCH—Dr. G. N. Mukherjee, L.M.S., the president of the Katwa Branch breathed his last on 10 August, 1955, at the age of 79. He was a pious and orthodox Brahmin. He sacrificed everything he had, in the freedom movement of our country. One of the oldest physicians who was loved by all.

KISHANGANJ BRANCH—A meeting of the branch was held on 19-8-55. Ten members were present. The imposition of tax on profession, trade, employment and callings by the Kishanganj University was disapproved.

MADURA BRANCH—A meeting of the branch was held on 30-7-55 with Dr. T. S. Renga Iyengar in the chair. Sixty three members were present. Dr. M. N. Rajan cited true case sheets of such patients for whom a correct diagnosis was not made either owing to anything from a slight degree of carelessness on the part of the attending physician or surgeon.

MANDYA BRANCH—The annual general meeting of the branch was held on 4 September, 1955. Dr. H. Samasastry was in the chair. Twenty seven members were present. Office-bearers for 1954-55 were elected with Dr. H. Samasastry as president and Dr. Seta Rao as secretary. For constructing a house for the branch, the Mandya Municipal Council was requested to donate a plot of land. A Sub-Committee was formed to make necessary arrangements in connection with the proposed construction of a building.

MUZAFFARNAGAR BRANCH—The members of the branch in a meeting expressed deep sorrow at the sad and untimely death of Dr. Deo Rishi Sharma, the hony. secretary of the branch.

NALGONDA BRANCH—A meeting of the branch was held on 3-9-55 with Dr. N. R. V. Swamy in the chair. Dr. M. B. Haig presented a case of Nephritis with Mitral Stenosis. Dr. K. Subbarayudu read a paper on Insulin. The president spoke on Management of Diabetes Mellitus.

PORBANDAR BRANCH—A special meeting of the branch was held on 28-8-55 to wish "Bon Voyage" to Dr. H. H. Chanda, president of the branch. Dr. M. M. Nanavaty was in the chair. Sixteen members and a large number of gentlemen by special invitation attended the function. Dr. Nanavaty and some of the members eulogised the services of Dr. Chavda to the cause of the Association and wished Bon Voyage to him.

SANGAREDDY BRANCH—A meeting of the branch was held on 1-9-55 with Dr. Desai in the chair. Twenty members were present. Some papers and cases were presented. The members bade farewell to Dr. Desai, the president, Dr. Ramchandar and Dr. Omesh Chandra, under orders of transfer.

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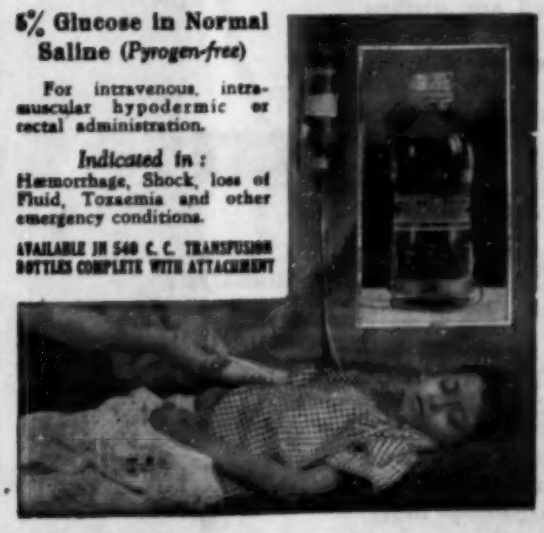

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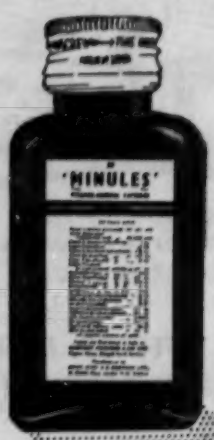

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